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NIAGARA REGION AGRICULTURAL RESEARCH REPORT

FRUIT BELT

BY
L.G. REEDS

DEPARTMENT OF GEOGRAPHY
McMASTER UNIVERSITY

Order

REGIONAL DEVELOPMENT BRANCH
DEPARTMENT OF TREASURY AND ECONOMICS

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DEPARTMENT OF TREASURY AND ECONOMICS
REGIONAL DEVELOPMENT BRANCH

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RESEARCH PAPER No. 2

NIAGARA REGION
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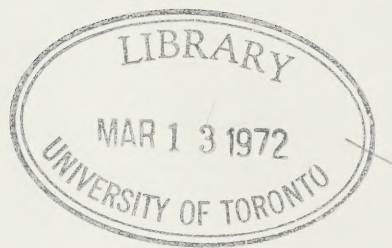
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L.G. REEDS

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McMASTER UNIVERSITY

MARCH 1969




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HAMILTON, ONTARIO

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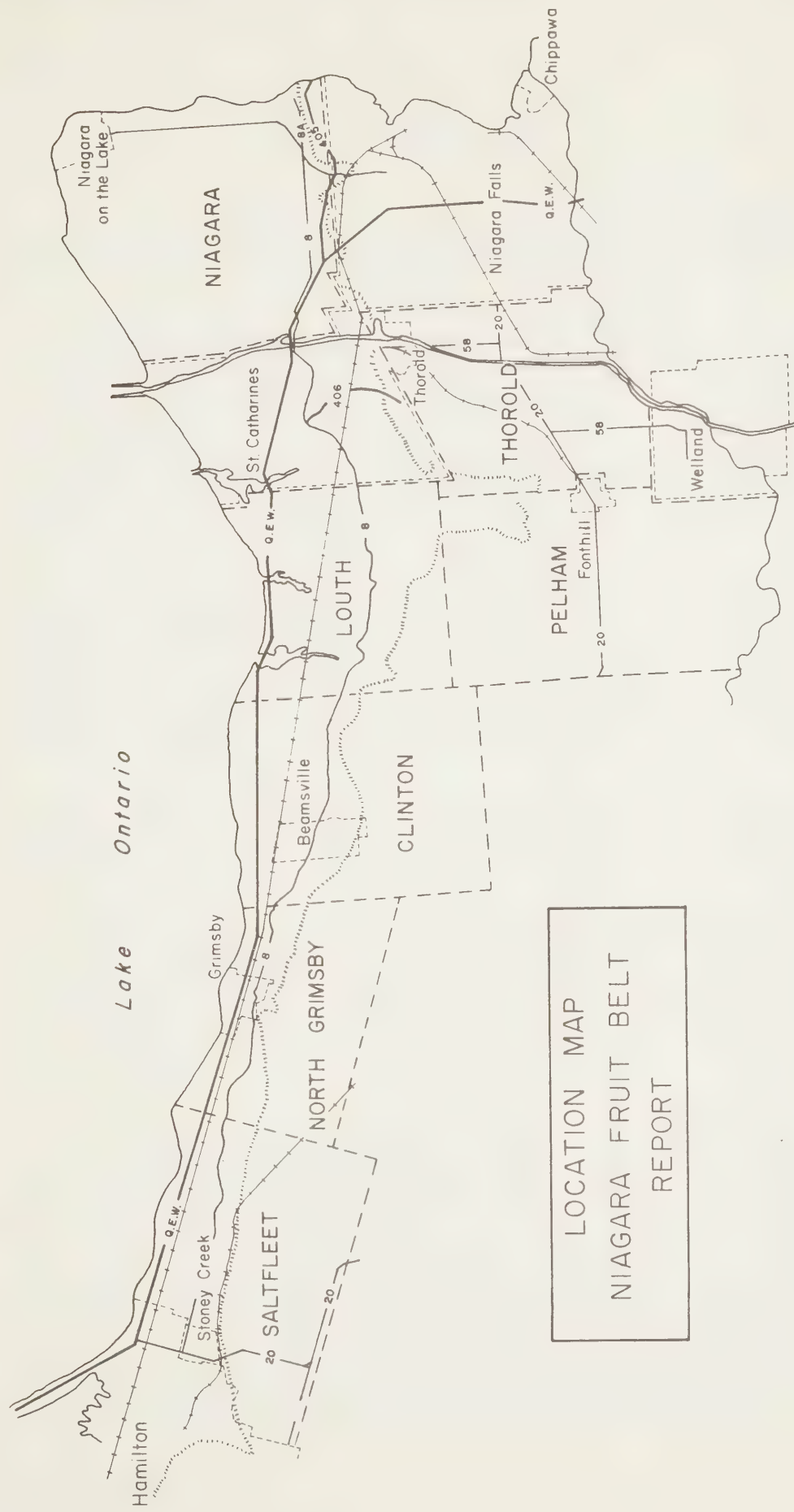
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LOCATION MAP
NIAGARA FRUIT BELT
REPORT

CHAPTER I

INTRODUCTION

The study of mixed farming areas of the Niagara Economic Region undertaken in 1967 presented certain conclusions regarding areal variations in agricultural productivity and income.

Two follow-up studies appeared necessary. One of these was a more detailed investigation of the factors underlying variations in income in the mixed farming areas. An intensive study of 43 commercial farms in Seneca Township was carried out. It was learned that the important socio-economic variables in farm performance are those which relate to the income needs and aspirations of the farmer and his family, to his past and present opportunities, and to the nature of economic incentives and rewards in farming. A complete summary of the findings of this research are reported in Chapter VIII.

The other follow-up study examined land use in the region surrounding the City of Hamilton and analyzed the factors that account for the varying types of non-farm development. Land use exhibited a specific pattern that related in part to economic criteria. The price difference between urban and rural land results in the spread of residential development into rural areas to a distance where the extra cost of commuting equals the savings gained from differences in the price of land. Chapter IX presents the findings on this topic.

The major aspect of the research undertaken in 1968 was an investigation of the fruit belt problem. It may be of interest to review briefly the region of the Niagara Fruit Belt and to discuss the factors which have influenced its subsequent development.

The production of fruit in the Niagara Peninsula began in the latter half of the 19th century. By 1880, about seven per cent of the occupied land in the 10 fruit belt townships was in orchards and gardens. Although the beginnings of specialization were evident before the turn of the century, the land use patterns of the fruit belt did not differ greatly from those of other parts of the peninsula or even from those of Southern Ontario.

By 1900, farmers in the fruit belt had realized that their region did not possess particular advantages for apple production. Growers in Nova-Scotia were in a better position to compete for the overseas markets while farmers in the Georgian Bay area and in the Lake Erie region and many other localities in Ontario could compete on an equal footing for the domestic market for apples. It was then that the particular value of the climate and soils for tender fruit production became apparent. A series of cold winters between 1897 and 1904 killed many of the peach trees in Kent and Essex. The Niagara Region escaped relatively untouched. This contributed greatly to its emergence as the most important centre of tender fruit production. A climatic disaster of this magnitude undoubtedly deterred a generation of growers in Kent and Essex from peach production and led them to concentrate on the less hazardous emphasis on

vegetables. With competition from other areas lessened, the expansion in the Niagara Fruit Belt was freer to proceed rapidly.

Since returns from fruit yielded higher returns per acre, mixed farming declined steadily where acreages of fruit and vegetables increased. The rapid growth of urban population and the rising standard of living created increased demands for the products of the area. The establishment of the Horticultural Experimental Station at Vineland fostered the development of sound fruit-growing practices. The introduction of new and improved varieties, a greater adaptation to specific soil types, improved spraying and other techniques served to increase production, leaving marketing, land use competition and urban sprawl as the most important unsolved problems facing the grower today.

Since returns from fruit yielded higher returns per acre, mixed farming north of the escarpment declined while acreages of fruit and vegetables increased. Since 1934, relatively large areas, exceeding 10,000 acres of land, that were formerly available for fruit production have been taken over for urban and associated uses. These changes have followed the construction of the Queen Elizabeth Way and the rapidly increasing urbanization of the Lake Ontario shore from Oshawa to Niagara Falls. In addition to the large areas that are actually being used for urban and associated purposes, other large areas have fallen within the urban shadow and are partially lost for effective agricultural production. These changes have been brought about by the increasing demands for urban land, by the resultant inflated land values, and by the economic conditions of the fruit-growing industry itself.

Dr. Krueger has examined quite closely the land use changes in the ten fruit belt townships since 1954. From a careful study of air photographs, he has charted the trends in the use of land, and the loss of land to urban and non-farm uses. He has repeatedly emphasized the urgent need to control urban sprawl and to conserve the best quality soil for tender fruit production. He points to regional planning as one of the most important means of saving the fruit belt.

Our study was undertaken to examine in greater depth the actual socio-economic situation in the fruit belt and to investigate the variable conditions that exist from one municipality to another. This report presents the major research findings and the recommendation that emerge therefrom.

CHAPTER II

SUMMARY AND RECOMMENDATIONS

The purpose of this study has been to investigate agricultural conditions in the fruit-growing areas of the Niagara Peninsula. Its specific aim was to examine the present patterns of land use, and to study the social and economic aspects of the fruit-growing industry.

Emphasis has been placed on the use of primary data obtained from field observations, aerial photographs, and from interviews. Reference has been made to the 1966 Agricultural Census of Canada and to other sources of statistical information in order to corroborate the findings of field research.

The following is a brief summary of the major findings of this study. The recommendations which emerge from this investigation are outlined in the second part of the chapter.

2.1 Summary

The study area, which includes the townships of Saltfleet, North Grimsby, Clinton, Louth, Pelham, and Niagara is comprised of a total of 117,698 acres of land. In 1966, 82,207 acres, or 70% of the total area, were cropland, of which a total of 43,000 acres were devoted to the production of tree fruit and grapes.

In 1966, the six municipalities had a total of 3,133 census farms of which 1,242 reported the sale of fruit or vegetables. On the basis of farm interviews, it is estimated that approximately 50% of all fruit growers operate on a part-time basis. The average size of sample farms was found to be 35.3 acres. If this figure is considered representative for the fruit belt as a whole, then the area of land that is owned by full-time fruit growers is only about 22,000 acres. Since it is the full-time farmer who is most likely to have a vested interest in the preservation of the land, a decline in the number of these operations and a decrease in the total acreage farmed on this basis has important consequences with regard to the future of fruit production in the region.

Within the study area, considerable variations in patterns of land use exist. Evidence obtained suggests there are important differences in the changes that have occurred in each municipality in recent years. By and large these variations appear to reflect differences in land prices and in proximity to the important urban centres such as Hamilton and St. Catharines. Past municipal policy and the degree of solidarity of the fruit industry in each area appear to be important considerations as well.

In the townships of Saltfleet and North Grimsby, fruit production in the area below the escarpment has experienced a drastic decline in recent years. While both municipalities still have a fair number of productive orchards and vineyards that are maintained by full and part-time growers, much of the land is vacant, and awaiting development. Many orchards show signs of neglect or abandonment, and there is virtually no evidence of farm improvements or of newly-planted orchards. Land prices,

which range from \$3,000 to \$10,000 per acre, are beyond a level at which fruit production can compete with other uses. Furthermore, in both areas, some of the best fruit land has already been taken out of production. This is particularly evident in North Grimsby where urban development is taking place in the areas to the east and west of the Town of Grimsby. In view of the very high land prices in both townships, and the fact that much of the land has already been affected by non-agricultural development, it is only a matter of time before commercial fruit production will cease. On these grounds, preservation of any of the remaining fruit land in these townships is difficult to justify. On the other hand, a case can be made for the protection of some of the escarpment lands as potential green-space areas.

The municipalities of Clinton and Louth form the core of the fruit belt. In both townships, over 50% of the acreage of cropland is devoted to fruit; together the area has approximately 40% of the region's total acreage in grapes and tree fruit. Farms generally are larger, and a majority of them are operated on a full-time basis. With the exception of the north-eastern part of Louth Township, where some non-farm residences have been built along the side roads, tender fruit land in these two municipalities has not as yet been seriously affected by urban development. The entire area of light-textured soils in the north-western part of Clinton is devoted to tree fruit. A similar concentration of several thousand acres planted to fruit occurs in the north-western part of Louth and extends westward into Clinton. These orchards generally are well maintained and contain a considerable area of new plantings. In addition to tree fruit, grape production occupies a prominent position in both townships.

Clinton and Louth are the main "unspoiled" areas in the Niagara Fruit Belt. Although land prices are high, fruit production still appears to be a competitive land use. The recent re-alignment of the Louth-St. Catharines boundary should accommodate the future growth of St. Catharines for many years. The proposed widening of County Road No.7, which forms the boundary between the former municipalities of Clinton and Louth, and the proposed construction of a trunk sewer in the same locality, may signify future urban development in that area. However, given proper planning measures, the problem of conflicting forms of land use could be solved. If such measures are forthcoming, and if economic incentives to fruit growers can be strengthened, the fruit industry should be able to retain its position of prominence for many years.

Of the six municipalities, Pelham Township has the largest acreage of land suitable for the production of tender fruit. However, soils are not comparable to the Vineland and Grimsby Sandy Loams. Furthermore, frost hazards are somewhat greater than in areas located below the escarpment. Both factors may have contributed to a decline of fruit production in the area in recent years. More important still are the pressures created by residential development, concentrated in the area south of Highway No. 20, and by the extraction of gravel and sand from the kame moraine on which the best orchards were formerly located. Although several large fruit operations still exist in the area, the industry faces a very uncertain future, and much will depend upon the planning measures that will be adopted.

The fruit industry in Niagara Township occupies a position which is comparable to that of Clinton and Louth. Over 70% of the township's total acreage of cropland is used for the production of tree fruit and grapes. However, many orchards appear neglected. One of the unique characteristics of the township is the large number of small, part-time operations, which represent over 70% of the total number of farms. The typical part-time farm is between 10 and 20 acres in size and is owned by a recent immigrant from Europe who is an industrial worker with a full-time job in St. Catharines or Niagara Falls. Although some of these people have undertaken considerable investments in their small fruit acreages, few of the people interviewed achieve annual gross incomes exceeding \$3,000. Since these people are not generally dependent upon incomes from the sale of fruit, high land prices, rising production costs, and unfavourable markets will not have any serious effects on their operations. In this respect, the presence of these small-scale growers may provide some measure of stability to the area. On the other hand, the type of fragmentation of land that has occurred is more or less irreversible, and is likely to complicate future planning.

Several fairly large fruit operations are found in the northern part of the township. Land use is more intensive, and orchards generally are well maintained. Except for some recent residential development in the vicinity of the Town of Virgil, further attention may be focussed upon this area with a view toward stabilization of land use and the provision of conditions which might assure the permanence of fruit production.

Interviews with some 106 full-time and part-time fruit growers provided information about the economic characteristics of the average operation, about the production problems confronting farmers, and about the attitudes of different people with respect to the future of the fruit belt.

As already pointed out, approximately 50% of all sample farms were found to be operated on a part-time basis. A distinction was made between former full-time fruit growers and small holders who originally came from the city. Average farm size for the first group was found to be 26.7 acres, and for the second group 16.1 acres. In contrast, the average full-time fruit operation is 35.3 acres in size. Insufficient farm size in terms of capital and acreage of land, and an inability to expand because of high land prices are two important reasons why many fruit growers have turned to other forms of employment. In the long run, even 35 acres of land may be insufficient to operate an efficient fruit enterprise, and it is likely that in the future the number of full-time operations will decline further.

Average annual net income for all part-time operations was estimated to be \$1,909, as compared to \$5,813 for full-time operations. Over 80% of all part-time operations were found to have negative returns to family labour. In other words, for most of these farms, net income is less than the total annual capital cost, when total farm capital is rated at 6% per annum. Approximately 60% of all full-time operations have negative returns to family labour. In any consideration of future plans for the Niagara Fruit Belt, due recognition must be given to these very large opportunity costs incurred by fruit growers. The implications are fairly obvious. If capital costs begin to exceed annual net income, the incentive to invest in fruit production is stifled because a farmer would obtain larger returns if he sold his property and invested the proceeds

elsewhere. It is estimated that for the average 35 acre fruit enterprise with an annual net income of \$5,813, fruit is only competitive with other uses as long as the price per acre of land does not exceed \$2,262. Only the three municipalities of Clinton, Pelham, and Niagara were found to have average land prices that are below this level. Under these conditions, the persistence of many farms in areas of high land prices can be explained only by the fact that they are either very efficient operations with above average incomes per acre, or that they are carrying on because of farm perquisites, and a large annual appreciation in land values.

In addition to the problem created by high land prices, conditions for fruit growers are further aggravated by constantly rising costs of production and by price uncertainties resulting from low-priced imported fruit.

It has been estimated that over the ten-year period between 1956 and 1966, the average total cost of growing an acre of peaches has increased from \$368 to \$606, or an increase of 65%. For other types of fruit, the trend is much the same. While there have been some increases in yields per acre, price increases for fruit have been small, and resulting increases in total farm returns have been insufficient to compensate for higher production costs. The effects are a lower rate of return to total investment, and less ability on the part of fruit growers to compete with other uses. The increasing volume of canned fruit imported from several countries and grapes for home wine-making from California has created problems for the local producers. As a result, many fruit growers have lost confidence in the industry, and if present conditions are allowed to persist, few farmers will be prepared to undertake the type of long-term investments that are necessary to assure the permanence of commercial fruit production in the region.

The difficulties with which fruit growers are presently confronted are clearly reflected in their production plans. Of the total sample of 106 fruit growers, 19% have indicated that they will cut back production or sell their property, 70% indicated that they will maintain production "for the time being," and only 11% stated that they are planning to expand production. Perhaps even more revealing are the attitudes expressed by different full and part-time fruit growers about the future of the fruit belt. Fully 32% indicated that they do not care about the nature of future developments in the area. Approximately 40% stated that the fruit land should be protected from non-agricultural forms of development, but that in the light of present conditions such a policy would be unrealistic. Only 28% of the respondents indicated that they would be in favour of saving the best land. In this context, it should also be pointed out that the majority of fruit growers that were interviewed are opposed to any arbitrary action which would impose limitations upon their freedom to use or sell their land in whichever way they see fit. The general feeling among this group of people seems to be, that an adjustment in product prices would be the most effective means of assuring the permanence of the fruit industry.

To obtain information relevant to this study, a total of 111 non-farm residents were interviewed. Interviews were restricted to home owners and tenants living within the sample block areas.

Over 75% of the total number of respondents are people with industrial jobs or other non-salaried employment, and with incomes that are generally below \$6,000 per year. This group of non-farm residents is most strongly represented in the townships of Saltfleet, Pelham, and Niagara. The remaining non-farm population is made up of skilled workers, small business owners, and professional people.

The orientation of the majority of non-farm residents appears to be toward the city; 91% indicated a city background, and 58% of all respondents bought or rented their present home within the last five years. The majority of rural non-farm families have pre-school or school-aged children. Eighty-two per cent own rather than rent their home.

Although there is no evidence that living in the country is less expensive than in the city, prices for residential properties and for home lots are generally lower. The predominance of wage-earning families, particularly in areas close to Hamilton and St. Catharines, suggests that lower property prices are one of the major reasons why these people have moved into rural areas. In other words, if homes or property lots could be made available in the cities at comparable prices, the incentive to move to the country would be considerably reduced.

Non-farm residents generally did not indicate any particular concern about the future of the Niagara Fruit Belt. The majority suggested that they would welcome additional residential development in their area since they feel that this would increase the number and quality of services that are provided. This attitude clearly is in contradiction with the statement made by many respondents, that they have moved to the country because they prefer country living. A small group of non-farm residents indicated that they are in favour of saving the fruit belt. They are generally opposed to any further residential development in their area. Many of these people were found to have either a rural or a farm background. Their explanation that they have settled in the country because they prefer country living, is easily credible.

2.2 Conclusions

In the light of the findings of this study, we have arrived at the following conclusions and recommendations:

1. That the preservation of a maximum amount of fruit land (i.e. all land presently devoted to the production of fruit) is unrealistic, and cannot be justified in the light of present trends and economic conditions.
 - a. It can be shown that land prices in Saltfleet, North Grimsby, and parts of Louth and Pelham are beyond a level at which fruit production can compete effectively with other uses.
 - b. Because most fruit growers located in these areas anticipate the eventual sale of their property for non-agricultural uses, they are not prepared to make investments in new orchards or farm improvements.

- c. Orchards and vineyards located in areas of extremely high land prices frequently appear neglected, and many have deteriorated to the point where reclamation is not possible except by replanting.
- d. Only a fraction of the land in the so-called fruit belt is suitable for the production of fruit. Some orchards in North Grimsby, Pelham and other areas have been abandoned as a result of physical limitations of the land and not because of urban pressures.

With the exception of land taken out of production in Saltfleet and North Grimsby, most of the best fruit land in the region is still being used for fruit-growing.

- 2. That many fruit growers fail to undertake investments in new orchards and other farm improvements

because

- a. Operations frequently are too small to be economically viable.
- b. Many fruit growers have turned to other forms of employment, and are not interested in making investments which they cannot reclaim.
- c. Many growers are unable or unwilling to expand their operation because of prohibitive land prices and unfavourable market conditions.
- d. Many growers anticipate the sale of their property.
- e. Many growers have lost confidence in the market and will not invest as long as conditions of uncertainty prevail.

- 3. That the majority of fruit growers would object to any measures which would "freeze" their land or impose any restrictions upon their freedom to use or dispose of their land in whichever way they see fit.

- a. The farmer's investment in land constitutes the equivalent of a retirement savings fund. The possession of the title to such land and the right and freedom to sell at his pleasure is a dominant part of his "bundle of rights." It is an important reason why farm people are prepared to endure despite often adverse conditions, and why they are willing to accept low incomes and even lower respect.
- b. Fruit growers have had little protection in the past. They have operated under free enterprise conditions and have been prepared to take both gains and losses as a result. To impose limitations upon their traditional rights without fair compensation would be the surest way to stifle all interest and investment in fruit production. This would undoubtedly mean the demise of the industry.

4. That the movement of city residents to the country is largely an economic phenomenon which can be traced to price-differential in residential properties.

2.3 Recommendations

We recommend that

1. The core areas of tender fruit land outlined in Figure 1 be given further attention as areas potentially suitable for preservation.

These areas comprise a total area of approximately 10,240 acres of first class tender fruit land.

With the exception of the northern core area in Niagara and the limited residential development along Lincoln County Road No. 4, they are relatively unaffected as yet by urban sprawl. Orchards are generally well-managed, contain new plantings and are operated for the most part on a full-time basis.

The quarrying of gravel constitutes a potential threat to the area designated for preservation in Pelham.

Estimated acreages of tender fruit land indicated on Figure 1 are as follows:

Clinton	2,880 Acres
Louth	3,680 Acres
Niagara	2,080 Acres
Pelham	1,600 Acres
Total	10,240 Acres

2. If the objective is to assure the permanence of fruit production in the areas designated in Figure 1, then we recommend that a positive approach be adopted that will create the economic conditions necessary for the continuation of the viable fruit-growing industry.

In this connection, the following action may be considered:

- a. The regulation by government action of the dumping of foreign fruit on the Canadian market.
- b. The offering of certain privileges to fruit growers such as a reduction in property taxes analogous to those accorded other industries.
- c. The provision of loans at favourable rates that will enable growers to expand their operation and to make the necessary improvements.
- d. The acceleration of research on diseases and the creation of new varieties demanded by the canning industries and the consumer.

3. If the measures suggested under No. 2 cannot be implemented or are not effective, zoning or expropriation may be necessary in order to protect the land.

Because of the economic difficulties confronting growers, there is no guarantee that zoning alone or other such measures will assure the continuation of fruit production.

If land is zoned for agricultural use, we recommend that fruit growers should be fully compensated for losses incurred by such regulations. They should receive a payment which represents the difference between the value of the land for agricultural use and the actual market value of the land.

If land is expropriated, the owners should be compensated at a rate somewhat above the current market value of their property because of

- a. the loss of the right to sell their land at a price and at a time of their choice
 - b. the loss in farm perquisites
 - c. the loss in capital invested in fruit trees, buildings and other non-saleable assets.
4. That land, if expropriated by the Government of Ontario be acquired as "green-space areas" that will be vitally essential in the growing conurbation that is taking shape between Oshawa and Niagara Falls.

CHAPTER III

PHYSICAL BASIS FOR AGRICULTURE IN THE FRUIT BELT

The bulk of the fruit being grown in the Niagara Peninsula is located to the north of the escarpment, on the gentle moraines immediately to its south and on the Fonthill kame. These areas have considerable acreages of sandy soil that are particularly well adapted for the production of peaches and sweet cherries, the tree fruits with the most exacting soil requirements. The well-drained sandy loams have been referred to as the tender fruit soils. Many are derived from the deltaic sands that were laid down on the Lake Ontario plain in the former glacial Lake Iroquois and from the fluvio-glacial deposits of the Fonthill area.

Drainage relates to the depth of sandy parent material; an imperfectly drained sand occurs where clay underlies the sands at depths of less than three feet.

The soils of the Grimsby and Vineland series are the best tender fruit soils in the peninsula. They are also quite well adapted for the production of the new French hybrid-type grapes and also for small fruit and vegetables. The Grimsby soils are rated excellent for tender fruit because of their good drainage and deep porous rooting zone; they have a lower water-holding capacity than the soils of the Vineland series and benefit from sprinkler irrigation. Winona soils with a shallower depth of sand over clay are not rated as highly for peaches as Grimsby or Vineland but are highly satisfactory for pears, plus and grapes. The soils of the kames to the south of the escarpment are deep and well-drained; in the areas underlain by coarse gravel, excessive drainage becomes a problem.

The climate of the Niagara lowland to the north of the escarpment is the most favourable area in Canada for the growth of peaches and sweet cherries. The suitability of the area for tender tree fruits is related to the following climatic conditions.

The Lake Ontario plain has sufficient winter chill to break the rest period. Proximity to Lake Ontario precludes unseasonably warm temperatures during the chill period.

During the winter, the fruit buds of peaches seldom survive -12°F , while -20°F is usually fatal to the trees. These temperatures provide only general guidelines, since other factors such as variety of peach, air and soil drainage, and health of trees also determine whether injury will occur. The odds of injury from severe winter temperatures are 3 in 30 in the Niagara Fruit Belt.

In the spring, developing blossom buds are killed by a temperature between 23°F and 26°F . Danger from spring frost injury is less on the Lake Ontario plain than anywhere else in Ontario. The moderating influence of Lake Ontario delays blossoming until the frost danger is past.

The fruit belt has sufficient length of growing season for tender tree fruit. Plant growth is dependent not only on the length of the growing season but also on the amount of heat available during this period. An index of the amount of heat is given by seasonal

accumulation of "Growing Degree Days" which is defined as the number of degrees of mean daily temperature above a base of 42°F. Southern Ontario has a range of less than 2,800 growing degree-days in the uplands to 4,400 on Pelee Island. The fruit belt has over 3,800 mean annual growing degree-days. The frost-free period is also one of the longest in Ontario.

The area benefits from the absence of winds of high velocities at any time of the year. This condition is related to the sheltering effect of the escarpment. The area has freedom from hail and heavy rain storms when the fruit is near maturity.

The Fonthill area is somewhat inferior climatically to the Lake Ontario plain for tender tree fruit. However, it has the benefit of good air drainage which tends to reduce the frost hazard.

The Niagara Fruit Belt thus has a climate that is uniquely endowed for the production of tender tree fruits. Few areas in Canada or even in North America have such an ideal combination of soils, climate and proximity to a large body of water.

At the same time, one should point out that research presently being conducted may result in the development of new varieties of peaches that are more tolerant of heavier-textured soils and of more severe winters. Should these researches succeed, other areas in Ontario such as the Lake Erie shore may become more important peach-producing areas in the future.

CHAPTER IV

RESEARCH METHODS

The following research procedures were adopted in the investigation of land use in the Niagara Fruit Belt.

A reconnaissance was conducted initially in order to gain an overview of the land use patterns and of the problems confronting the industry. Plans were made for a more detailed study of various representative sample areas. A stratified, systematic, unaligned, point sample was used to select fifty, one hundred acre lots throughout the municipalities of Saltfleet, North Grimsby, Clinton, Louth, Niagara, and Pelham. Certain adjustments in samples were made after consultation with Mr. Corwin Cambray of the Regional Development Branch. The final sample represents approximately 9% of the fruit-growing area in the six municipalities. Figure 2 shows the location of sample blocks and their distribution with reference to tender fruit soils.

During the month of June of 1968, a series of oblique aerial photographs were taken of each sample area. Photos were taken at an altitude of 1,500 to 2,000 feet above ground with the use of a 35 mm S.L.R. camera.

Land use interpretations were made for a number of selected representative photographs. These photos are reproduced in Chapter Six.

Additional primary information was collected by interviewing all fruit growers as well as the majority of rural non-farm residents in each sample block. Copies of each of the two types of questionnaires are included in the Appendix. Quantitative data were transferred unto standard eighty-column computer cards for further analyses on an IBM 7040 digital computer.

Linear regression analysis was used to determine relationships and levels of significance for individual economic variables pertaining to the farm sector. In addition, summary statistics of economic farm data were prepared on a township basis.

Non-quantitative data were coded by devising suitable response categories. Response frequency percentages were estimated for each category. Results of the data analysis are presented in Chapter Five. A data matrix and a list of all economic variables are included in the Appendix.

Discussions with real estate agents, municipal officers, and other local people proved useful. The Agricultural Census of Canada for 1966, and other statistical and informative material, were examined.

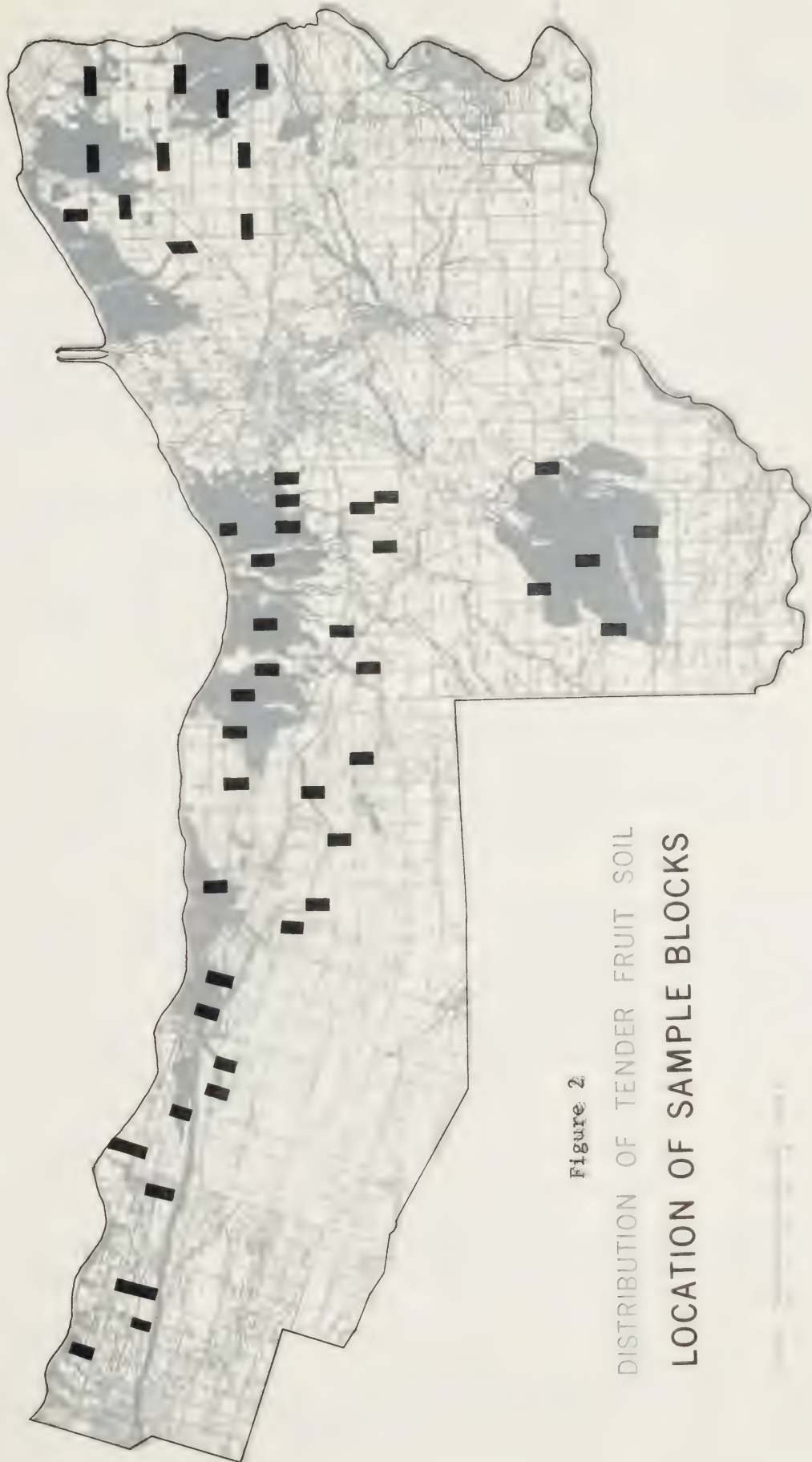


Figure 2
DISTRIBUTION OF TENDER FRUIT SOIL
LOCATION OF SAMPLE BLOCKS

LOCATION OF SAMPLE BLOCKS

Figure 5





Figure 2
DISTRIBUTION OF TENDER FRUIT SOIL

Scale. 0 1 2 3 4 MILES

CHAPTER V

ANALYSIS OF DATA FROM FARM AND NON-FARM INTERVIEWS

Interviews with numerous farm people and non-farm residents were conducted in order to obtain a more precise understanding of the various factors that relate to the problems of the Niagara Fruit Belt.

Interviews were restricted to property owners within sample blocks. A few sample areas in the townships of Saltfleet, North Grimsby, and in the eastern part of Louth were found to contain an inordinate number of urban residences, while most of the remaining agricultural land generally was found to be vacant. In these cases, the number of interviews was reduced by visiting only every third dwelling. However, all farmers remaining in such blocks were approached.

The distinction between a farm and a non-farm interview was made arbitrarily by asking the respondent whether or not he normally obtains any income from the sale of agricultural products. A total of 217 interviews yielded 185 usable questionnaires.¹ Of this latter number, 57.3%, or 106 questionnaires, represent farm contacts, while the remaining 42.7%, or 79 questionnaires, represent contacts with non-farm residents.

5.1 Research Findings from Farm Interviews

The objective of interviewing fruit growers was to obtain primary information on pertinent economic aspects of the individual operation, to ascertain the nature of local attitudes and opinions regarding the future of fruit production in the area, and to identify important production problems as indicated by farmers. This section will deal with the findings under the first and second objectives, while the question of production problems will be considered in Chapter VII.

For every observation, a total of 26 variables were considered; a list of all variables considered is included in the Appendix. Items of information pertaining to individual farms may be abstracted from the Data Source Matrix (Appendix). Linear regression analysis was used to assess the relevance of individual variables. Sets of variables with levels of significance exceeding the 95% level are listed in Table I. Summary statistics of important variables were prepared for township sample groups in order to facilitate comparisons (Table II and III).

a. Economic Characteristics of Sample Farms

The sample consists of 56 full-time and 50 part-time operations.²

In Saltfleet Township, seven of the eight farms contacted, or 87.5%, are full-time operations. In contrast, the proportion of full-time farms is 78% in Louth, 75% in

¹ Several non-farm questionnaires were rejected because respondents were unable or unwilling to provide the information requested.

² For the purpose of this study a part-time farm was defined as any operation with a farm income, but whose owner or tenant holds a full-time or a part-time job off the farm.

Clinton, 33.3% in North Grimsby and Pelham, and 28.6% in Niagara township. In view of the very strong urban trends evident in Saltfleet, the high proportion of full-time operations within this sample appears contradictory to the pattern one might expect. However, with land prices well in excess of \$4,000 per acre and constantly rising, many fruit growers have gradually phased out their production, and have turned to employment in the city. Despite pressure upon farmers to sell out, a few growers with sufficiently large farm incomes have been able to persist. Very substantial annual increases in land values provide additional incentive to full-time fruit growers to defer the sale of their property as long as possible.

The townships of Clinton and Louth constitute the heart of the present fruit belt, and ratios between full and part-time farmers, as indicated by sample data, may be considered representative. The townships of North Grimsby, Pelham, and Niagara occupy roughly comparable positions with respect to distance from nearby urban centres. In all three municipalities, part-time operations constitute a distinct majority.

As one might expect, linear regression results show a significant relationship between the status of farmers as full or part-time operators and annual net incomes. The sample mean for full-time operations is \$5,813 as compared to \$1,909 for part-time farms.

Linear regression failed to show a significant relationship between the status of farmers and farm size. This relationship does exist. However, it is partly obscured by the fact that many part-time farms are comparable in size to existing full-time operations. On the other hand, several full-time operations have less land than the average part-time farm. If average farm size is estimated by making a distinction between full-time farms, part-time operations owned by farmers, and part-time operations owned by non-farmers, differences in average farm size are clearly evident. The average farm size for the three groups is 35.3 acres, 26.7 acres, and 16.1 acres respectively. It is of interest to note that the largest proportion of part-time operations owned by non-farmers is found in Niagara Township. In all other sample areas, the majority of part-time operations are owned by people who previously were full-time fruit growers.

Data is insufficient to assess the relative efficiency of different part-time operations vis-a-vis full-time farms. However, if returns to family labour³ are calculated, part-time farming clearly stands out as a very inefficient method of operation. It was found that 80% of all part-time operations in the sample have negative returns to family labour. In other words, for each of these operations, gross annual income is insufficient to cover the cost of capital and cash inputs. High capital costs generally reflect the large investments in land. Since capital costs attributable to land do not represent cash sums which the part-time farmer must raise,⁴ he is in a position to treat them as opportunity costs. As such, farm perquisites and the amenities of country living may represent fair compensation. A consideration of no less importance is the fact that in recent years annual increases in land values in the Niagara Region have been well in excess of 6%. If

³ Returns to family labour = Gross Income — (Total Farm Capital X 0.06 + Cash Operating Expenses).

⁴ Unless he is paying a mortgage, in which case the amount of interest paid every year represents part of his capital cost.

one assumes a hypothetical increase of 10%, the part-time farmer's capital cost in land, estimated at 6%, would be covered, and his investment in land would yield a return of 4% without any effort on his part. In the light of these broader considerations, part-time farming is very profitable. However, since these otherwise marginal operations persist for reasons other than profits from the sale of farm products, it is unrealistic to assume that the people who own these farms will undertake any significant investment to expand output and to improve their operation. Survey results show that 16% of the part-time farmers in the sample plan to decrease production, 72% have indicated that they will maintain their present level of output for the time being, while 12% have indicated a desire to increase production.

For many of these small fruit growers, it is clearly only a question of time before they will sell out, while the timing of their decision will largely depend on prices being "right." With increasing urban pressures in the townships of Saltfleet, North Grimsby, and to a lesser extent in Pelham, a gradual decline and an eventual disappearance of part-time farms is probably inevitable. If the continuation of fruit production can be assured, many full-time growers in Clinton and Louth will likely feel the need to expand production, and to increase their acreage in fruit. This should lead to a consolidation of smaller properties and to a reduction in the number of part-time farms. On the other hand, if present trends continue, the number of part-time operations is likely to increase as more farmers decide to seek other forms of employment. At the present time, Niagara Township is the municipality with the lowest average land prices, and is least affected by transactions which take fruit land out of production. The existence of a large number of part-time operations owned by non-farmers does not seem to detract from the basically agricultural characteristics of the area. Newly planted orchards evident on some of these small properties, suggest that the presence of these people may even provide an element of stability to the area, and assure that in the foreseeable future good fruit land will be retained for agricultural uses.

Full-time operations included in the sample range in size from 6 to 198 acres.⁵ The average farm size is 35.3 acres, with an average of 23.7 acres planted to fruit. Average annual gross income is \$16,980, of which 34.2%, or \$5,813, are mean annual returns. Depending on the efficiency of an operation, the type of fruit that is produced, and the manner in which it is sold, net returns may be as high as 50% of total annual proceeds.

If capital costs are added to cash operating expenditures, 58.9% of the full-time fruit growers have negative returns to family labour. On a township basis, all sample farms in Saltfleet and in Pelham have negative returns; in North Grimsby, Clinton, Louth, and Niagara the percentage of farms in this category is 33%, 58.3%, 52.4%, and 40% respectively. Again, the major portion of capital cost is attributable to land.

These findings indicate that many fruit growers, despite fairly large net returns, are in a precarious situation if they begin to consider the opportunity costs on their

⁵ The sample includes three large mixed farms with some land devoted to grape production. These operations are located above the Niagara Escarpment. The largest fruit farm in the sample is 105 acres in size, with 90 acres devoted to grapes.

investment. They may take solace in the fact that their net worth is rising at an unprecedented rate, and with little effort on their part. However, under these conditions few farmers are prepared to expand production, and to undertake the kind of investment that might assure the long-run profitability of their operation.

Survey results, summarized in the following table, show that only a very limited number of fruit growers are considering measures to increase production.

	N	Number of full-time fruit growers planning to:		
		Cut back Production	Maintain Production	Expand Production
Saltfleet	7	5	2	-
North Grimsby	3	-	3	-
Clinton	12	3	9	-
Louth	21	2	14	5
Pelham	3	-	3	-
Niagara	10	2	8	-
Total Sample	56	12	39	5
Percentage	100%	21.4%	69.6%	8.9%

It is also of interest to note that the group of farmers planning to decrease production has on the average lower net returns and somewhat lower acreages in fruit than farmers planning to maintain or to increase production. The following table illustrates this pattern.

	56 Farm Sample Mean	Decrease Production	Maintain Production	Increase Production
Average Net Returns	\$5,813	\$3,525	\$6,152	\$8,660
Average Acreage in Fruit	23.7	18.9	24.9	26.2

The inference from this observation is that some operations are either too small in terms of total acreage or that they have an insufficient area of land planted to fruit to be economically viable. Linear regression results indicate a significant relationship between total acreage in fruit and annual gross and net income.

TABLE I
SIMPLE CORRELATION COEFFICIENTS FOR
SELECTED VARIABLES

Variables Compared	Value of R	Level of Significance ¹
Soil Type/Total Acres	0.394	99%
Soil Type/Acres Grapes	0.389	99%
Soil Type/Acres Total Fruit	0.337	99%
Soil Type/Other Uses	0.259	99%
Total Acres/Acres Grapes	0.519	99%
Total Acres/Total Fruit	0.194	95%
Total Acres/Other Uses	0.850	99%
Total Acres/Capital Land	0.627	99%
Total Acres/Total Farm Capital	0.667	99%
Total Acres/Total Expenditures	0.325	99%
Total Acres/Gross Income	0.318	99%
Total Acres/Net Income	0.290	99%
Tender Fruit ² /Other Fruit	0.372	99%
Tender Fruit/Total Fruit	0.493	99%
Tender Fruit/Capital Land	0.289	99%
Tender Fruit/Total Farm Capital	0.340	99%
Tender Fruit/Total Expenditures	0.417	99%
Tender Fruit/Gross Income	0.408	99%
Tender Fruit/Net Income	0.324	99%
Total Fruit ² /Capital Land	0.623	99%
Total Fruit/Total Farm Capital	0.701	99%
Total Fruit/Total Expenditures	0.411	99%
Total Fruit/Gross Income	0.433	99%
Total Fruit/Net Income	0.455	99%

¹ Correlation coefficients are significant at the 95 and 99 per cent level where the value of R exceeds 0.195 and 0.254 respectively.

² Acreage in tender fruit; acreage in total fruit.

TABLE II
SUMMARY STATISTICS
ECONOMIC CHARACTERISTICS OF SAMPLE FARMS BY TOWNSHIPS

Township	Number of Sample Farms	Average Farm Size Acres	Mean Gross Returns Acre	Mean Estim. Land Value Per Acre	Mean Total Farm Capital	Mean Capital Cost At 6%/Ann.	Mean Oper. Expenses	Mean Total Cost	Mean Gross Income	Mean Returns To Family Labour ¹
			\$	\$	\$	\$	\$	\$	\$	\$
Saltfleet	8	29.3	414	4,312	141,250	8,472	8,910	17,382	12,150	-5,232
North Grimsby	10	30.5	335	3,420	86,100	5,166	6,696	11,862	10,245	-1,617
Clinton	16	45.6	411	2,103	93,906	5,634	12,825	18,459	18,750	+ 291
Louth	27	26.3	580	3,037	82,574	4,954	9,309	14,263	15,277	+1,014
Pelham	10	40.0	89	2,220	79,820	4,789	1,555	6,344	3,570	-2,774
Niagara	35	19.7	306	2,094	51,465	3,087	3,940	7,027	6,040	- 987
Total Sample	106	28.9	378	2,640	78,514	4,710	7,059	11,769	10,936	- 833

¹ Returns to Family Labour = Gross Income - (Cash Operating Expenses + Capital Cost)

TABLE III

SUMMARY STATISTICS
ECONOMIC CHARACTERISTICS OF SAMPLE FARMS BY TOWNSHIPS (*continued*)

Township	Number of Sample Blocks	Total Number of Sample Farms	Average Farm Size Acres	Average Total Fruit Acres	% Farms With Pos. Returns To Family Labour	% Full Time Farmers	Farm Goals			Save Fruitbelt		
							Percentage Response			Percentage Response		
							Cut	Maintain	Expand	Do not Care	Not Possible	Yes
Saltfleet	5	8	29.3	21.1	0.0	87.5	75.0	25.0	0.0	25.0	62.5	12.5
North Grimsby	7	10	30.5	21.9	20.0	33.3	20.0	70.0	10.0	30.0	30.0	40.0
Clinton	8	16	45.6	22.0	43.8	75.0	18.8	75.0	6.2	25.0	37.5	37.5
Louth	13	27	26.3	17.3	44.4	77.7	11.1	66.7	22.2	7.4	59.2	33.4
Pelham	5	10	40.0	7.4	33.3	33.3	10.0	80.0	10.0	40.0	40.0	20.0
Niagara	11	35	19.7	14.1	25.7	28.6	14.3	77.1	8.6	54.2	22.9	22.9
Total Sample	49	106	28.9	16.8	33.3	52.8	18.9	69.8	11.3	32.0	39.6	28.4

b. Opinions of Fruit Growers about the Future of the Fruit Belt

To ascertain farmers' attitudes about the future of fruit production and about the protection of land, they were asked the following question: *"Some people have advocated preservation of the fruit belt. How do you feel about this?"* This was followed by a probing question to determine the reasons for their opinion. If they were in favour of protecting some of the land to assure the continuation of fruit production in the area, they were asked how this might be achieved.

Important statements made by respondents were recorded verbatim, and, except where farmers objected, a portable tape-recorder was used to record information provided in response to these questions.

Attitudes and opinions on this issue ranged from complete indifference to active support for the idea. However, as indicated by the data in Table III, the general consensus of opinion seems to be that saving the fruit belt would be a "good thing," but that it is not economically feasible.

To obtain some quantitative information about the overall response pattern, three response categories were used. The first group includes all people who stated that they do not care about the nature of future developments in the area. The second group is made up of people who indicated that the fruit belt should be saved but who felt that this is not feasible. The third group consists of people who suggested that the fruit belt or part of it should be saved, regardless of the cost. Below is a series of actual quotations of statements made by different people in each group.

Of the 106 full- and part-time fruit growers interviewed, 34 or 32% indicated that they do not care about future patterns of development in the fruit belt. If comparisons are made on a township basis, it is evident from Table III that by far the highest proportion of respondents holding this particular view is found in Niagara Township. This seems to relate to the fact that this particular township also has the highest proportion of part-time fruit growers. Most of these people have full-time jobs in St. Catharines or Niagara Falls, and are not dependent upon farm incomes. It should be noted however, that this attitude of indifference is not unique to this particular segment of the farm population. Fully 38.2% of the people holding this view are full-time fruit growers from the townships of Saltfleet, Clinton, Louth, and Niagara.

The following statements are typical for the first of the three response categories:

"It's hard to say. I don't really care, I would like to sell out myself."

"We'll be quite happy to sell the land to any development. I couldn't care less about the future of the fruit belt."

"I could sell tomorrow, and I wouldn't care."

"If people want to protect the fruit belt let them buy it, as for me, I couldn't care less what happens."

"The smart fellow today is selling his farm and going to work, and that's exactly what I intend to do. In the long run, it is always the farmer who gets the dirty end of the deal."

"Let them do all the protecting they want, as long as they don't come around here telling me what to do."

"No, I am against protecting the fruit belt; if fruit is not competitive with other uses, there is no sense in trying to protect the land."

"For people like us it doesn't really matter what happens, if I can subdivide my ten acres and sell them as lots I won't do any complaining."

"I will sell, my son isn't interested in farming and I don't blame him. All I am asking for is a decent price for my property."

A total of 42 people or 39.6% felt that saving the fruit belt would be a good thing, but that the present economics of fruit growing and the high prices of land do not justify such action; 47.6% of the people in this group are full-time fruit growers. The following quotations indicate the general feelings of this particular group:

"Why save the area if it isn't economically feasible; 90% of farmers will quit if they get a decent price."

"Don't save the fruit belt, save the farmers and they won't have to sell their land."

"It would be wonderful, but is not possible under present government regulations."

"In theory it is a nice idea, but the price of fruit will not justify saving it."

"It is a good idea, but how can any farmer stay in business with such high land prices?"

"I am in favour of saving the fruit belt, but I don't see how this is possible under present conditions."

"I am all in favour but how? Government schemes are not realistic. The fruit belt would protect itself if conditions were better."

"Most farmers will laugh at this question. Land prices and imports make it impossible."

"It should be maintained for fruit production, but the government doesn't care."

"Ideally yes, but it cannot be tied down to agricultural uses. If fruit prices were high enough the land wouldn't go."

"It should be saved. On the other hand, you can't blame the farmer for wanting to sell if the price is right."

Thirty respondents or 28.4% of the sample felt that the fruit belt should be saved, and did not raise any questions about the feasibility of such an undertaking. Of this group 63.3% are full-time growers. These people generally provided reasons why the fruit belt should be saved. However, they were unable to formulate any clear suggestions on how this might be achieved.

"The area has good soils and a favourable climate. It is the only place in Canada where fruit will grow well. The area below the escarpment should be saved."

"The good sandy soil should be saved; it is the only place in eastern Canada where you can grow peaches."

"It is good land, and it is too good for houses and industry."

"It should be saved, or we will have to import our fruit."

"There are some areas which are poor, so why not sell these for other uses, and keep the best land in fruit?"

"Save it, further generations are being deprived of something they can never regain."

"The best land should be saved."

"The fruit belt must be saved. It is a crime to build houses on this good land."

"The government should buy the land and keep it in fruit production."

"It is about 20 years too late to do any good, but the least we can do is to protect some of the best land that is still in fruit production."

The following table gives a summary of the response pattern for the entire farm sample.

Type of Response	Full-time Growers	Part-time Growers	Total Sample
"Don't care"	(13) 38.2%	(21) 61.8%	(34) 32.0%
"In favour, but not feasible"	(20) 47.6%	(22) 52.4%	(42) 39.6%
"In favour, fruit belt must be saved"	(19) 63.3%	(11) 36.7%	(30) 28.4%

It is evident from these figures that the group of people giving the first type of response has the highest percentage of part-time fruit growers. In contrast, the group interested in saving the fruit belt has the highest percentage of full-time fruit growers of the three response groups. It must be remembered, however, that those farmers who stated that saving the fruit belt is not economically feasible, generally hold very dim views about the future of fruit production in the area. In that sense, their attitude does

not differ significantly from the attitude of people in the first group. If respondents in groups one and two are combined, the group remaining and most likely to support measures to protect the land, is very small indeed.

The views presented by different people suggest that the continued inflation in land prices constitutes an important reason for the deterioration of agricultural conditions in the Niagara Fruit Belt. It is equally obvious however, that the problems of the fruit grower must be viewed within the total economic context of fruit production. Faced with constantly rising costs of production, and with domestic markets seriously undercut by low-priced fruit from other countries, fruit growers are not prepared to undertake the kind of investments required to maintain their formerly competitive position. Under these conditions, measures to preserve the fruit belt may protect some land, but provide no guarantee whatever that fruit production in the area will continue on a commercial scale.

5.2 Research Findings from Non-Farm Interviews

A total of 111 non-farm residents were interviewed throughout the study area. Seventy-nine usable questionnaires were obtained. The objective of this part of the study was to collect primary information about the occupational and income characteristics of non-farm residents, and to gain some insights into the motivation of these people to take up residence in rural-urban fringe areas or in the country.

Information obtained from questionnaires is summarized in Table IV. It will be noted that 77.3% of the sample consists of people with "blue collar" jobs. This group constitutes the commuting segment of the rural non-farm population. The majority of these people are employed in industry in the cities of Hamilton, St. Catharines, Welland, and Niagara Falls. This tends to explain the higher percentage of people in this group in the townships of Saltfleet, Pelham, and Niagara. While precise income data were not obtained, annual gross incomes of people in this group are generally below \$6,000. In cases where the wife is employed as well, this figure may be somewhat higher. The majority of these families have between two and five pre-school and school-aged children, a factor which was frequently cited as one of the reasons for taking up residence in the country. This group also contains a considerable number of post World War II immigrants from Europe, who were previously living in the city and who have moved into rural areas only within the last few years.

The second group makes up 15.1% of the sample non-farm residents. People in this group are skilled workers or proprietors of small firms. The majority of these people are from the local area, and generally have lived there all their lives. Except for the workers in this group, very few of the people that are self-employed are commuting more than a few miles.

A mere 7.6% of the sample are professional people, including lawyers, doctors, teachers etc. The sample from North Grimsby was found to have the highest proportion of people in this group. North Grimsby has in recent years attracted a considerable number of people in this higher income category, and the sample pattern for that area is probably representative. On the other hand, sample blocks selected in Clinton, Pelham, and Niagara were not found to have any non-farm residents belonging to this

TABLE IV
OCCUPATIONAL GROUPING AND MOTIVATION OF NON-FARM RESIDENTS

Township	N = 100%	Percentage of Residents By Occupational Groups ¹			Own Property	Rent	Bought Less Than 5 Yr.Ago	Motivation for Moving to the Country			Other Reasons
		Group I	Group II	Group III				Like to Live in the Country	Lower Costs	Always Lived There	
Saltfleet	17	82.4%	11.8%	5.8%	82.4%	17.6%	47.1%	70.6%	-	-	29.4%
North Grimsby	19	68.4%	10.5%	21.1%	78.9%	21.1%	89.5%	47.4%	15.8%	-	36.8%
Clinton	7	71.4%	28.6%	-	85.7%	14.3%	71.4%	71.4%	14.3%	-	14.3%
Louth	13	69.2%	23.1%	7.7%	76.9%	23.1%	46.2%	53.8%	7.7%	30.8%	7.7%
Pelham	9	88.9%	11.1%	-	88.9%	11.1%	44.4%	55.6%	22.2%	11.1%	11.1%
Niagara	14	85.7%	14.3%	-	85.7%	14.3%	42.8%	64.3%	7.1%	14.3%	14.3%
Total Sample	79	77.3%	15.1%	7.6%	82.3%	17.7%	58.2%	59.5%	10.1%	8.9%	21.5%

¹ Group I Labourers and semi-skilled "blue collar" workers
 Group II Skilled workers and small business operators
 Group III Professional People.

group, while only one non-farm resident in each of the townships of Saltfleet and Louth is in this category.

Questions designed to ascertain people's motivation in moving to the country did not always yield conclusive information. Many respondents were vague and indefinite, while others frequently gave several reasons to explain why they had moved to the country.

From Table IV it is evident that preference for country living was the most typical kind of response. Since the majority of the people interviewed belong to the lowest of the three income groups, it is suggested that a considerable proportion of all non-farm residents, perhaps more than 50%, have purchased or built homes outside of the city because of somewhat lower prices for homes or building lots.⁶ An attempt was made to determine the relevance of this factor by asking people if they would have moved to the country if prices for lots and homes nearer or within the city had been comparable. Only 13% of all respondents admitted that this factor played an important role in their decision. Few people indicated that it costs less to live in the country, while others have suggested that country living is actually more expensive. There is no evidence of important differences in the cost of living between the city and the country, although it should be kept in mind that considerable expenses are incurred by many non-farm residents in commuting to and from their places of employment every day.

Other reasons cited include the following: lower property taxes, more spacious homes and larger building lots, cleaner air, less traffic and a more congenial environment for the upbringing of children. A small proportion of non-farm residents were born and raised on the farm or grew up in the country and have lived there all their life.

Non-farm residents also were asked about the future of the fruit belt. The predominant attitude on this issue seems to be one of indifference. Many people indicated that they would welcome further development in their area because they feel that this would increase the number and quality of services available. On the other hand, those who felt that the fruit belt should be saved were either people with a rural background or individuals who wish to protect their status quo as country dwellers. Few people seem to have a very clear understanding of the nature of problems pertaining to the area in which they live.

Although he lives in the country, the typical non-farm resident is not part of the rural community. If he came from the city his strongest ties are still urban-oriented.

⁶ A recent study by A.D. Ward tends to substantiate this assumption:

WARD, A.D. *A Predictive Model for Land Use in the Rural Urban Fringe*, MA Thesis, McMaster University, Hamilton, 1968.

CHAPTER VI

PATTERNS OF LAND USE, AN OVERVIEW

The purpose of the following discussion is to present a general description of patterns of land use in the six townships of the Niagara Fruit Belt. Statistical data quoted in each section were abstracted from unpublished non-confidential records of the 1966 Agricultural Census of Canada. Estimates of the area of land in each township suitable for the production of tender fruit are based upon Fig. 2, which shows the distribution of tender fruit soils in the region. To illustrate the variability of patterns of land use within and between individual townships, a series of oblique aerial photographs of representative sample blocks are reproduced in Figs 3 to 16. Other descriptive and interpretative information presented here is based upon interviews and field observations made during the summer of 1968.

The six townships in the Niagara Fruit Belt (excluding the municipality of St. Catharines) comprise a total area of 117,698 acres. The area of cropland in 1966 was 82,207 acres or 69.8% of the total area. Land use for the area of cropland was as follows:

Field Crops	33,852 acres	41.2%
Tree Fruit	24,068 acres	29.3%
Grapes	21,053 acres	25.6%
Vegetable, Small Fruit, Nurseries	3,234 acres	3.9%
Total Cropland	82,207 acres	100.0%

It is estimated that the total area of tender fruit soils comprises 26,560 acres. Since considerable acreages of the best fruit land have already been taken out of production, the actual acreage of productive tender fruit land is likely to be somewhat smaller.

In 1966, the total number of farms in the six municipalities was 3,133. However, only about 40% of this group, or 1,242 farms were classified as fruit or vegetable enterprises. Results from interviews of farmers in each of the 51 sample blocks indicate that approximately 50% of the farm sample is made up of part-time operations. If this figure is considered representative¹ for the area as a whole, it is estimated that there are only between 600 and 700 full-time fruit growers in the region. Estimates based upon data derived from questionnaires also show that the average farm size of a full-time fruit grower is 35.3 acres. This suggests that only about 22,000 acres of land or less than one quarter of the total area of improved land of 101,590 acres is in the hands of full-time fruit growers. It is this group of people which is most likely to have a vested interest in the preservation of fruit land. However, this group clearly constitutes a declining minority, and as more and more farmers contemplate the sale of their property, or turn to more secure sources of income, the deterioration of agricultural conditions in the Niagara Fruit Belt is likely to continue unabated.

¹ Census data for 1966 indicates that 48.8% of all farmers in the six municipalities hold full or part-time jobs off the farm.

6.1 Township of Saltfleet

Total Area	18,936 acres	
Cropland	12,471 acres	100.0%
Field Crops	7,329 acres	58.7%
Tree Fruit	2,585 acres	20.7%
Grapes	2,224 acres	17.8%
Vegetable, Small Fruit, Nurseries	333 acres	2.8%
Total Number of Farms	414	
Total Number of Fruit Growers	106	
Approximate Area of Tender Fruit Soil	1,920 acres	

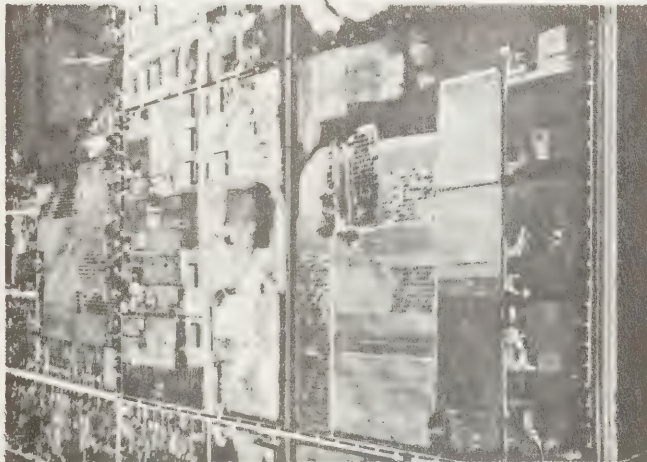
Saltfleet Township ranks second after Pelham in terms of the percentage of cropland devoted to field crops. This is partly a reflection of the fact that the traditional area of fruit production below the escarpment comprises only about two fifths of the township's total area. In addition, recent urban and industrial development in the western part of the township has led to a considerable reduction in the area devoted to fruit. Since most of this development has occurred on land below the escarpment, an absolute decline in the acreage in fruit resulted. In contrast, much of the land above the escarpment, devoted primarily to mixed farming and the production of field crops, has been little affected by these developments. Consequently, the percentage of land in field crops may have increased somewhat relative to the percentage of land in fruit.

The extent to which orchards have been displaced by other uses is well illustrated by Fig. 3A. It is this north-western portion of the township which has been subjected to the greatest amount of pressure for other forms of development. Since this area also coincides with the distribution of Winona Sandy Loam, the soil type most suited for the production of peaches and sweet cherries, the acreage of tender fruit land remaining is negligible.

Toward the east, non-farm development typically consists of many residences built along the side roads and highways (Fig. 4A). Although some areas in this section are maintained in fruit production (Fig. 4B), few full-time farmers are left, and many of the existing orchards are deteriorating.

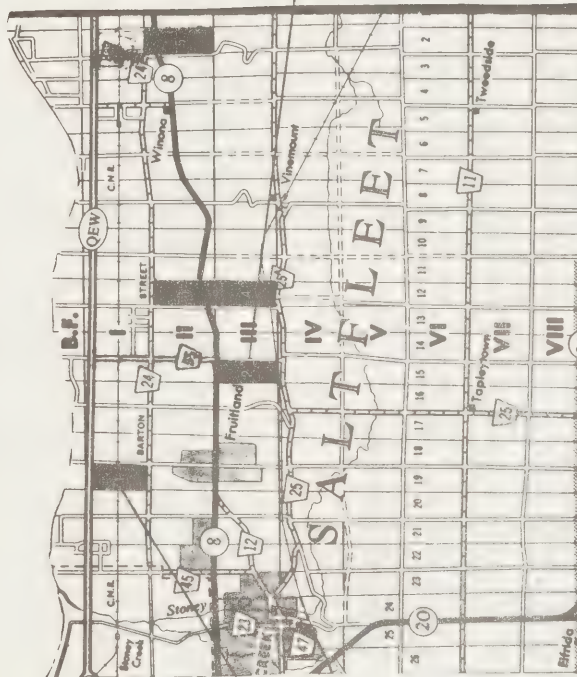
As already pointed out, non-farm residential development above the escarpment is less extensive, and there are still a number of producing orchards and vineyards. Much of this land however, is ill-suited for the production of tree fruit, and the predominant use is for fodder crops.

The demand for land for industrial and residential purposes in Saltfleet has resulted in extremely high land prices. Prices in the township for land situated below the escarpment range from \$4,000 to \$10,000 per acre. Under these conditions, fruit is unable to compete with other uses, and the eventual disappearance of orchards from the area is inevitable.



LAND USE A

Tender Fruit	10%
Other Tree Fruit	5%
Grapes	15%
Market Garden	15%
Other Uses*	55%
No. of farms in block	6
No. of part-time farms	4
No. of non-farm residences	7
* Mixed, Vacant, Bush, etc.	



LEGEND

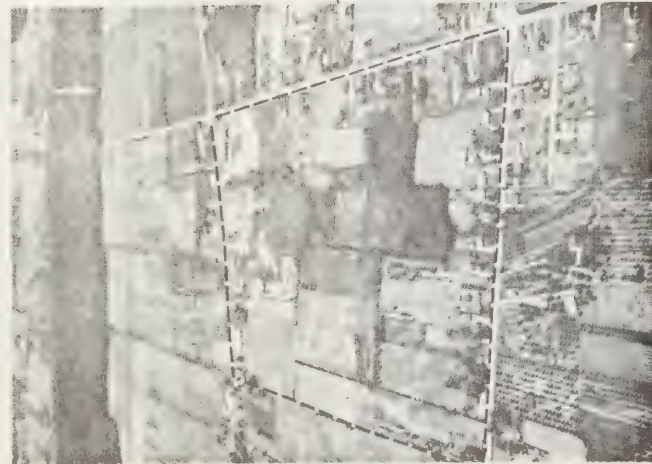
P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial



LAND USE B

Tender Fruit	21%
Other Tree Fruit	13%
Grapes	31%
Market Garden	0%
Other Uses*	35%
No. of farms in block	2
No. of part-time farms	0
No. of non-farm residences	2
* Mixed, Vacant, Bush, etc.	

Figure 3
SAMPLE BLOCKS, SALT FLEET.



LAND USE

Tender Fruit	0%
Other Tree Fruit	5%
Grapes	25%
Market Garden	15%
Other Uses*	55%
No. of farms in block	4
No. of part-time farms	4
No. of non-farm residences	29

*Mixed, Vacant, Bush, etc.

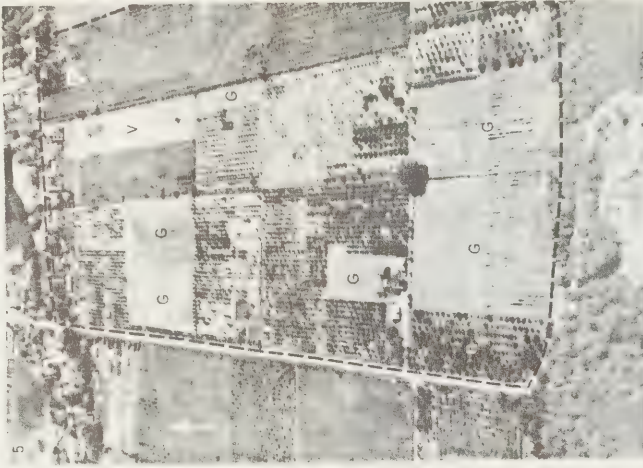


LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	lo	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 4

SAMPLE BLOCKS, SALT FLEET.



LAND USE

Tender Fruit	0%
Other Tree Fruit	53%
Grapes	27%
Market Garden	4%
Other Uses*	16%
No. of farms in block	4
No. of part-time farms	2
No. of non-farm residences	4

*Mixed, Vacant, Bush, etc.

6.2 Township of North Grimsby

Total Area	11,816 acres	
Cropland	7,850 acres	100.0%
Field Crops	3,371 acres	43.0%
Tree Fruit	2,405 acres	30.6%
Grapes	1,997 acres	25.4%
Vegetable, Small Fruit, Nurseries	77 acres	1.0%
Total Number of Farms	327	
Total Number of Fruit Growers	116	
Approximate Area of Tender Fruit Soil	1,440 acres	

The production of tree fruit in the Township of North Grimsby is concentrated on Vineland Sandy Loam which extends over some 1,400 acres to the east and west of the Town of Grimsby. Again, it is this area of tender fruit soils which in recent years had been considerably reduced by urban development. The illustrations in Fig. 5A and 6B show the extent of this type of development. Both of these sample blocks are located entirely within the area of Vineland Sandy Loam. Although much of the residential development that has occurred in the township has been of the sub-division type, the photos in Fig. 5 and 6 provide some indication of the detrimental effects upon adjacent orchards.

The sample block shown in Fig. 5A is located on a small patch of Winona Fine Sandy Loam in the north-western part of the township. This area has been relatively unaffected by urban pressures. However, a limited amount of industrial development has occurred on land along the Queen Elizabeth Way.

Most of the remaining land below the escarpment belongs to the Trafalgar soil series. These soils have many limitations. Although in the past much of this land was used for the production of cherries, pears, plums, as well as grapes, many orchards have been abandoned, and are reverting to weeds and brush vegetation.

Approximately two-thirds of the township's total area is located above the escarpment. Except for an occasional non-farm residence, patterns of land use have undergone little change. Because grapes can tolerate heavier soils and more severe climate, they are the principal fruit crop grown here (Fig. 6B). In sheltered locations, one also finds cherry and pear orchards. For most of the farms located above the escarpment, fruit is not an important enterprise.

Since urban development in the township has occurred on some of the best land, with the consequence that the price of such land has risen considerably in recent years, the tender fruit industry in North Grimsby is likely to face a very uncertain future. On the other hand, poorer land for fruit, particularly above the escarpment, is less subject to these pressures. Here, the future of fruit and grape production will depend to a great extent on economic conditions.



LAND USE A

Tender Fruit	5%
Other Tree Fruit	2%
Grapes	27%
Market Garden	2%
Other Uses*	64%
No. of farms in block	5
No. of part-time farms	2
No. of non-farm residences	3

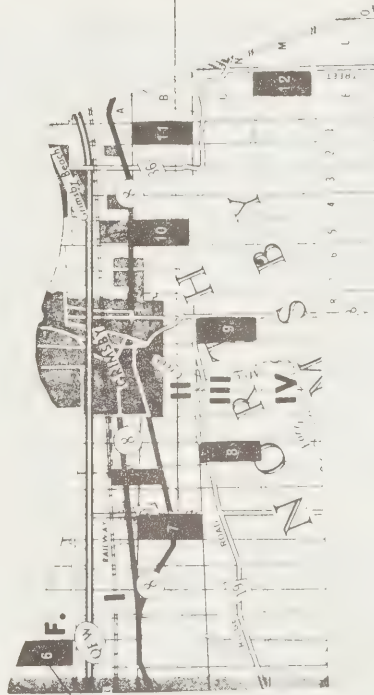
* Mixed, Vacant, Bush, etc.



LAND USE B

Tender Fruit	37%
Other Tree Fruit	2%
Grapes	6%
Market Garden	0%
Other Uses*	55%
No. of farms in block	4
No. of part-time farms	4
No. of non-farm residences	32

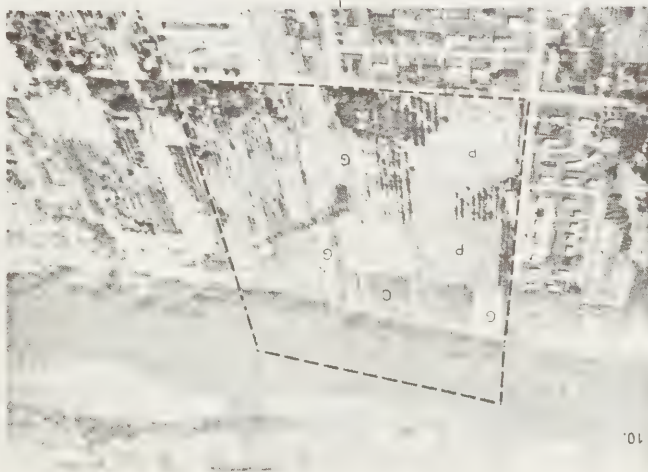
* Mixed, Vacant, Bush, etc.



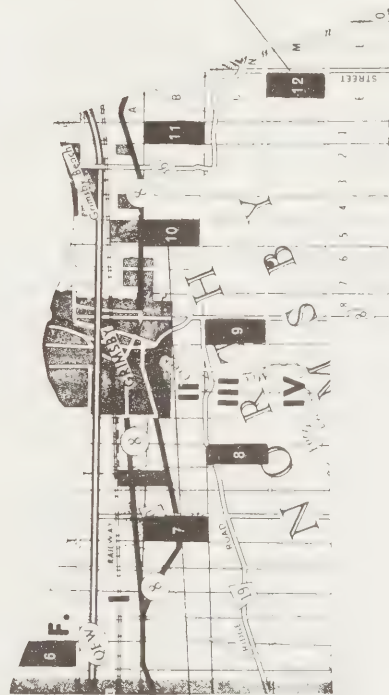
LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 5
SAMPLE BLOCKS, NORTH GRIMSBY.

LAND USE A

Tender Fruit	55%
Other Tree Fruit	7%
Grapes	3%
Market Garden	0%
Other Uses*	35%
No. of farms in block	4
No. of part-time farms	2
No. of non-farm residences	2
* Mixed, Vacant, Bush, etc.	



LEGEND

	P	G	C	Pa	A	V	Vegetables	F	Farm House
	Peaches	Grapes	Cherries	Pears	Apples	O	Other	PF	Part-time
						Mx	Mixed	R	Rural NF
						Io	Idle Orchard	Sub	Subdivision
						Va	Vacant	Ind	Industrial

LAND USE

Tender Fruit	10%
Other Tree Fruit	10%
Grapes	30%
Market Garden	0%
Other Uses*	50%
No. of farms in block	4
No. of part-time farms	0
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	

Figure 6
SAMPLE BLOCKS, NORTH GRIMSBY.

6.3 Township of Clinton

Total Area	22,762 acres	
Cropland	16,176 acres	100.0%
Field Crops	7,220 acres	44.6%
Tree Fruit	4,696 acres	29.0%
Grapes	3,956 acres	24.5%
Vegetable, Small Fruit, Nurseries	304 acres	1.9%

Total Number of Farms 614

Total Number of Fruit Growers 246

Approximate Area of Tender Fruit Soil 2,400 acres

Clinton Township may be considered the heart of the present fruit-growing area in the Niagara Peninsula. It is furthest removed from the urban influence extending outward from both Hamilton and St. Catharines. Also, in the past, municipal policies were agriculturally oriented, and were effective in preventing the type of urban sprawl characteristic of other areas.

It is estimated that over 70% of the fruit growers in the township operate on a full-time basis. Farms tend to be larger, both in terms of acreage and capitalization. Several of the larger operations are specializing in the production of grapes, or of one or two types of tree fruit. A number of fruit growers have indicated a desire to expand their operation; however, the general feeling seems to be that present land prices are too high and future fruit prices and markets too uncertain to warrant such action.

Although Clinton is not well-endowed with extensive areas of tender fruit land, a large proportion of the land suited for the production of grapes or tree fruit is devoted to that purpose. Grapes are the predominant crop on the extensive tract of Jeddo Clay Loam to the east and north of the town of Beamsville, between Highway Number 8 and Lake Ontario (Fig. 8A). Good orchards of tender tree fruit are found in the north-western corner of the township (Fig. 7B), and west of Vineland Station, near the Clinton and Louth municipal boundary (Fig. 8B).

The predominant soil type on the slope of the escarpment south of Highway Number 8, is Oneida Loam. Except for steep and dissected areas that are in natural vegetation, a good proportion of this land is in tree fruits, notably sweet and sour cherries, as well as pears. Recently, several residential dwellings have been built in this area.

An extensive tract of moderately well-drained Oneida Loam also occurs immediately above the escarpment. A considerable proportion of this land is used for grapes (Fig. 7A). One also finds a number of smaller orchards of sour cherries, pears, and other types of hardier tree fruit.

South of the Campden Road, land use reflects the dairy and mixed farming economy of the area.

The future of fruit production in Clinton Township does appear relatively secure. However, this should not be a foregone conclusion. Much will depend upon the policies

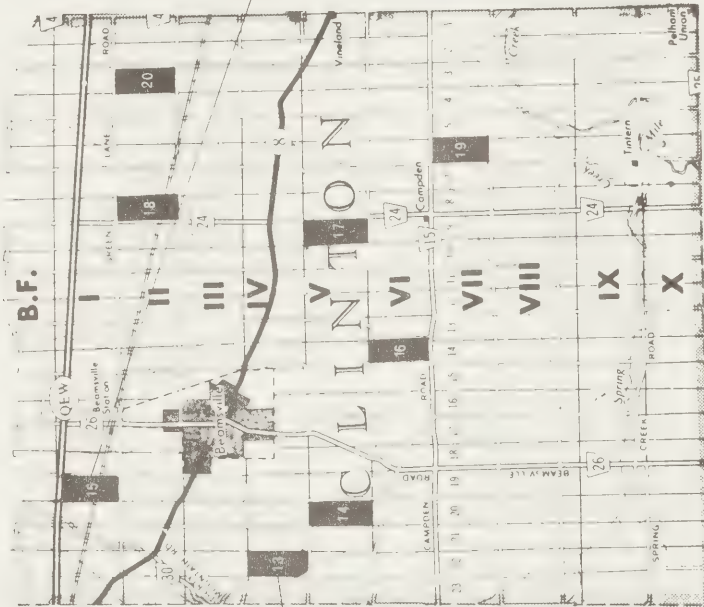
adopted by the municipality, upon future land prices, and the presence or absence of conditions under which fruit growers are prepared to undertake productive investments.



B

LAND USE

Tender Fruit	62%
Other Tree Fruit	21%
Grapes	0%
Market Garden	2%
Other Uses*	15%
No. of farms in block	6
No. of part-time farms	3
No. of non-farm residences	3
* Mixed, Vacant, Bush, etc.	



LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 7

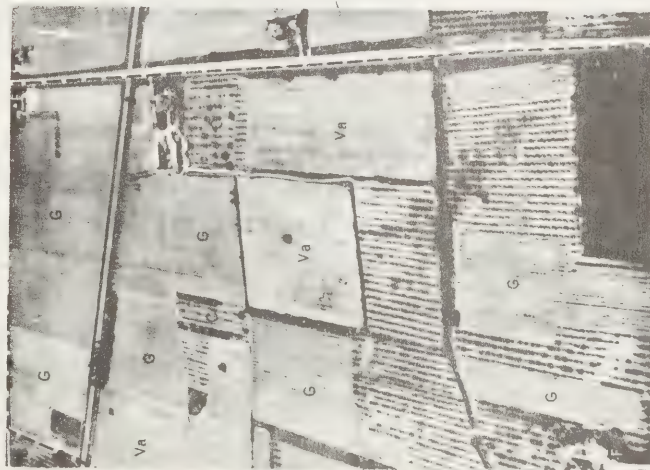
SAMPLE BLOCKS, CLINTON.



A

LAND USE

Tender Fruit	8%
Other Tree Fruit	11%
Grapes	69%
Market Garden	0%
Other Uses*	12%
No. of farms in block	1
No. of part-time farms	0
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	

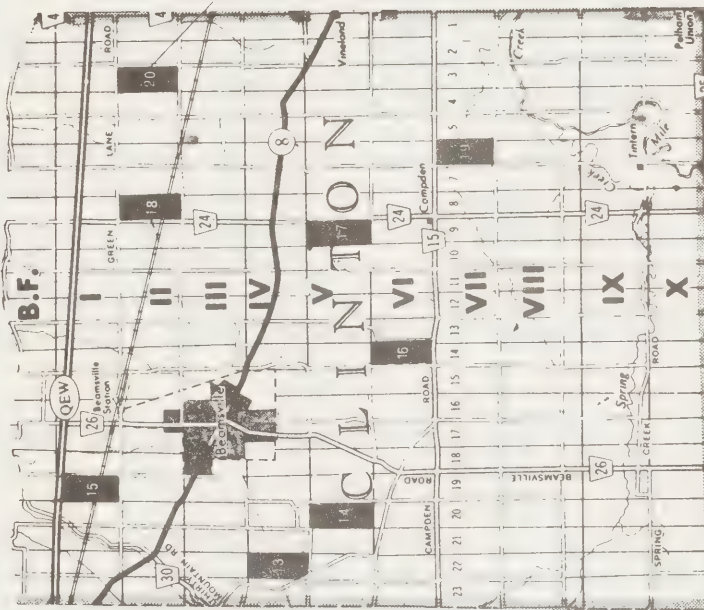


A

LAND USE

Tender Fruit	13%
Other Tree Fruit	12%
Grapes	55%
Market Garden	0%
Other Uses*	20%
No. of farms in block	2
No. of part-time farms	0
No. of non-farm residences	0

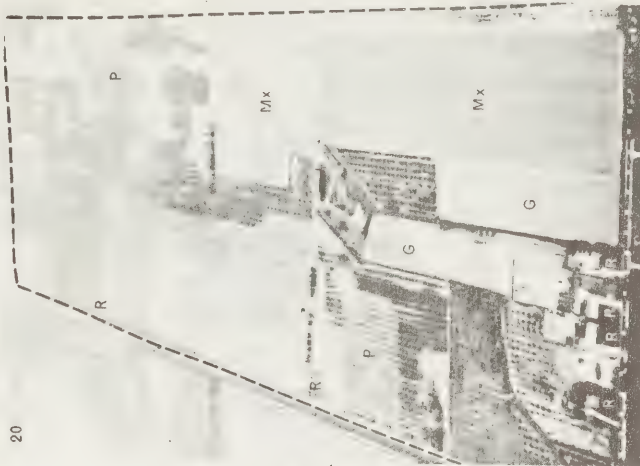
* Mixed, Vacant, Bush, etc.



LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 8
SAMPLE BLOCKS, CLINTON.



LAND USE

Tender Fruit	48%
Other Tree Fruit	10%
Grapes	5%
Market Garden	3%
Other Uses*	34%
No. of farms in block	6
No. of part-time farms	4
No. of non-farm residences	7

* Mixed, Vacant, Bush, etc.

6.4 Township of Louth

Total Area	16,542 acres	
Cropland	12,241 acres	100.0%
Field Crops	2,940 acres	24.0%
Tree Fruit	4,073 acres	33.3%
Grapes	4,742 acres	38.7%
Vegetable, Small Fruit, Nurseries	486 acres	4.0%
Total Number of Farms	436	
Total Number of Fruit Growers	231	
Approximate Area of Tender Fruit Soil	7,360 acres	

In the Township of Louth, fruit production is clearly the dominant agricultural activity. Over 70% of the area of cropland is devoted to fruit, with grapes occupying slightly more land than tree fruit. Some of the agricultural characteristics mentioned in the previous discussion of Clinton Township also apply to Louth. Farms tend to be larger and more specialized, and part-time farming is less prevalent.

Because of the availability of land for urban expansion within the boundaries of the City of St. Catharines, urban pressures upon land in the Township of Louth have been moderate. Residential development that has occurred has been localized in a small area in the north-eastern corner of the township, between the Queen Elizabeth Way and Lake Ontario. A number of recently-built non-farm residences are also found scattered throughout the central part of the township, between Highway 8 and the Town of Rockway.

Fruit production in Louth is more specialized than in any other township. The type of fruit being grown is closely related to soil type.

A wide belt of Vineland Fine Sandy Loam occurs in the northern part of the township, and extends from the eastern to the western boundaries. Land in this area is almost exclusively devoted to the production of peaches and sweet cherries (Fig. 9B, 10A). This land is also well-suited for market gardening (Fig. 12A), and several large vegetable enterprises are located in this area.

On Jeddo Clay Loam which occurs in a wide band north of, and parallel to Highway 8, land is used predominantly for the production of grapes. Some of the largest and best managed vineyards in the Niagara Peninsula are found in this area (Fig. 12B).

Grapes are also the dominant fruit crop on Smithville Loam in the area between Highway 8 and the escarpment (Fig. 11B). This particular soil type, as well as Oneida Loam, also occurs above the escarpment. For several farms located in this part of the township, grape production is a major enterprise (Fig. 9A).

As one might expect, land prices on an average are considerably higher than they are in Clinton Township. Prices quoted by farmers range from \$3,000 to \$6,000 per acre for

land with tender fruit soils, and from \$1,500 to \$4,000 per acre for land with heavier soils and land located above the escarpment. While the dominant role of the fruit economy in the township has in the past provided a modicum of stability to the area, land values have become inflated. Here, as in other townships, land prices are not in line with the economic returns from agricultural uses, but rather reflect the potential of such land for urban and industrial uses.

22.



LAND USE A

Tender Fruit	0%
Other Tree Fruit	26%
Grapes	57%
Market Garden	0%
Other Uses*	17%
No. of farms in block	3
No. of part-time farms	1
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	



LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	lo	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Tender Fruit	85%
Other Tree Fruit	0%
Grapes	0%
Market Garden	0%
Other Uses*	15%
No. of farms in block	5
No. of part-time farms	2
No. of non-farm residences	2
* Mixed, Vacant, Bush, etc.	

LAND USE B

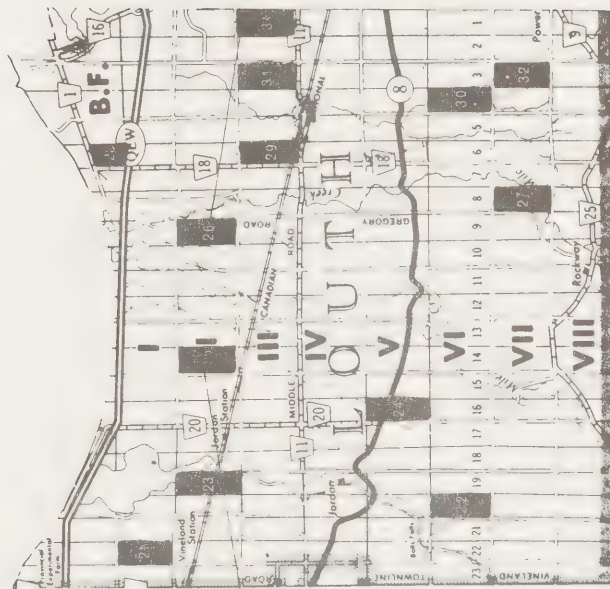


Figure 9
SAMPLE BLOCKS, LOUTH.



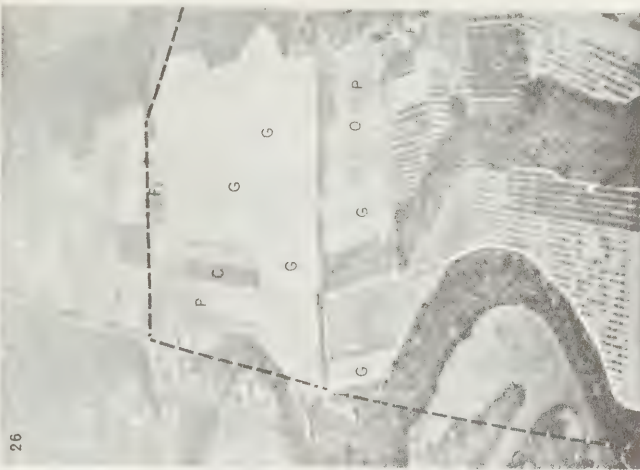
LAND USE A

Tender Fruit	60%
Other Tree Fruit	24%
Grapes	5%
Market Garden	2%
Other Uses*	9%
No. of farms in block	3
No. of part-time farms	0
No. of non-farm residences	1
* Mixed, Vacant, Bush, etc.	



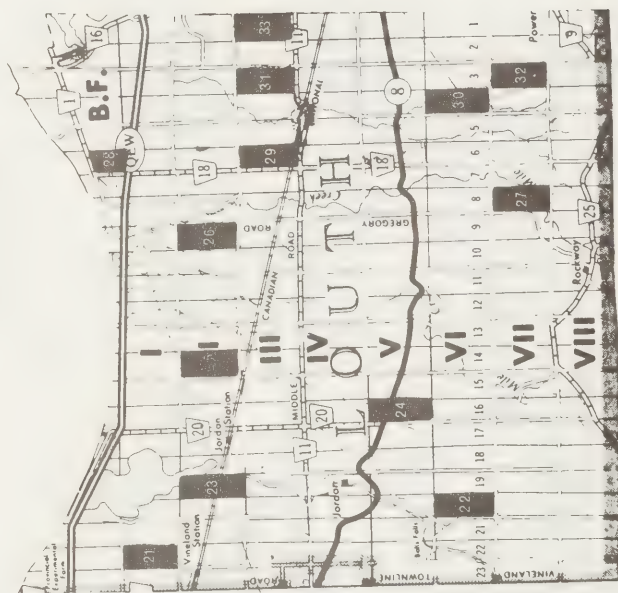
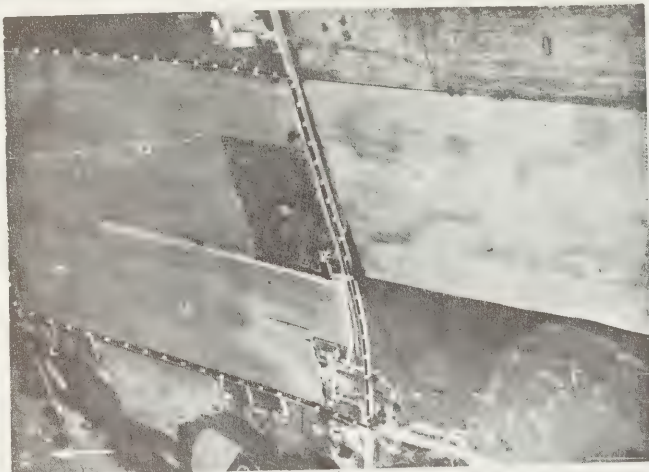
LEGEND	
P	Peaches
G	Grapes
C	Cherries
Pa	Pears
A	Apples
V	vegetables
O	Other
Mx	Mixed
lo	Idle Orchard
Va	Vacant
F	Farm House
PF	Part-time
R	Rural NF
Sub	Subdivision
Ind	Industrial

Figure 10
SAMPLE BLOCKS, LOUTH.



LAND USE B

Tender Fruit	12%
Other Tree Fruit	13%
Grapes	40%
Market Garden	0%
Other Uses*	35%
No. of farms in block	3
No. of part-time farms	1
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	



LAND USE A

Tender Fruit	10%
Other Tree Fruit	70%
Grapes	10%
Market Garden	0%
Other Uses*	10%
No. of farms in block	2
No. of part-time farms	0
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	

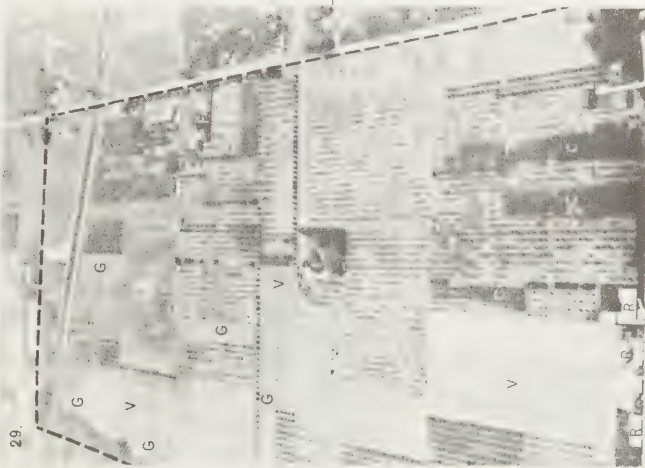
LAND USE B

Tender Fruit	5%
Other Tree Fruit	0%
Grapes	94%
Market Garden	0%
Other Uses*	1%
No. of farms in block	1
No. of part-time farms	0
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	

LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 11
SAMPLE BLOCKS, LOUTH.



LAND USE

Tender Fruit	45%
Other Tree Fruit	20%
Grapes	8%
Market Garden	20%
Other Uses*	7%
No. of farms in block	5
No. of part-time farms	0
No. of non-farm residences	3
* Mixed, Vacant, Bush, etc.	

LAND USE

Tender Fruit	0%
Other Tree Fruit	0%
Grapes	60%
Market Garden	0%
Other Uses*	40%
No. of farms in block	3
No. of part-time farms	3
No. of non-farm residences	6
* Mixed, Vacant, Bush, etc.	

LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	Io	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

Figure 12
SAMPLE BLOCKS, LOUTH.

6.5 Township of Pelham

Total Area	20,035 acres	100.0%
Cropland	12,139 acres	71.6%
Field Crops	8,688 acres	15.8%
Tree Fruit	1,924 acres	6.7%
Grapes	808 acres	5.9%
Vegetable, Small Fruit, Nurseries	719 acres	
Total Number of Farms	352	
Total Number of Fruit Growers	69	

Approximate Area of Tender Fruit Soil 8,800 acres

Pelham Township has the largest area of tender fruit land. The above figures, however, indicate that less than 30% of such land is actually used for the production of tree fruit or of grapes. Field observations suggest that the acreage devoted to tree fruit has decreased considerably in recent years.

The core of the Pelham tender fruit area is located on the Fonthill Moraine, north of Highway 20, and to the north and west of the Town of Ridgeville. The principal crops are peaches and sweet cherries. Most of the land in this area is held by full-time fruit growers who operate fairly large farms, ranging from 40 to over 100 acres in size. In the past, these growers were able to achieve fairly large incomes from the production of fruit. However, the extraction of sand and gravel, which has become a major activity in this area (Fig. 14A) has created conditions of uncertainty for many farmers.

Traditionally, tree fruit was also grown further to the north between North Pelham and the Town of Effingham. One still finds a few productive farms in this area, but much of this land seems to be poorly used, and some orchards show signs of neglect, while others appear to have been abandoned (Fig. 13B).

Approximately half of the tender fruit soils in Pelham occur in the area to the south of Highway 20. Numerous small orchards are still found scattered throughout this area. However, much of this land is giving way to other uses. Haphazard as well as planned residential development is occurring in this area (Fig. 13A, 14B).

In theory, one would expect that fruit production in Pelham would retain an important position. However, both past and present trends do not justify such optimism. With competition from gravel companies and from residential development, and with limited local interest in the preservation of the best land, a further decline in the importance of fruit production may be expected.



A

LAND USE

Tender Fruit	10%
Other Tree Fruit	35%
Grapes	0%
Market Garden	10%
Other Uses*	45%
No. of farms in block	5
No. of part-time farms	2
No. of non-farm residences	5
* Mixed, Vacant, Bush, etc.	

LEGEND

P	Peaches	V	Vegetables	F	Farm House
G	Grapes	O	Other	PF	Part-time
C	Cherries	Mx	Mixed	R	Rural NF
Pa	Pears	lo	Idle Orchard	Sub	Subdivision
A	Apples	Va	Vacant	Ind	Industrial

B

LAND USE

Tender Fruit	35%
Other Tree Fruit	0%
Grapes	10%
Market Garden	0%
Other Uses*	55%
No. of farms in block	3
No. of part-time farms	2
No. of non-farm residences	0
* Mixed, Vacant, Bush, etc.	

Figure 13
SAMPLE BLOCKS, PELHAM.



LAND USE

Tender Fruit
Other Tree Fruit
Grapes
Market Garden
Other Uses*
No. of farms in block
No. of part-time farms
No. of non-farm residences
* Mixed, Vacant, Bush, etc.

25%
10%
15%
0%
50%
1
0
0

A

LEGEND

P Peaches
G Grapes
C Cherries
Pa Pears
A Apples
V Vegetables
O Other
Mx Mixed
Io Idle Orchard
Va Vacant
F Farm House
PF Part-time
R Rural NF
Sub Subdivision
Ind Industrial

B

LAND USE

Tender Fruit
Other Tree Fruit
Grapes
Market Garden
Other Uses*
No. of farms in block
No. of part-time farms
No. of non-farm residences
* Mixed, Vacant, Bush, etc.

0%
0%
4%
0%
96%
2
2
4

Figure 14
SAMPLE BLOCKS, PELHAM.

6.6 Township of Niagara

Total Area	27,607 acres	
Cropland	21,330 acres	100.0%
Field Crops	4,304 acres	20.2%
Tree Fruit	8,385 acres	39.3%
Grapes	7,326 acres	34.3%
Vegetable, Small Fruit, Nurseries	1,315 acres	6.2%
Total Number of Farms	990	
Total Number of Fruit Growers	474	
Approximate Area of Tender Fruit Soil	6,080 acres	

Among the six townships considered in this study, Niagara occupies a unique position. Although the municipality ranks only third after Pelham and Louth in terms of area of tender fruit land, it has fully one third of the region's total acreage in tree fruit, and one third of the total acreage in grapes. It has by far the largest number of farms, as well as the highest proportion of part-time operations. With the exception perhaps of Clinton, it is the municipality that is least affected by residential development.

The production of tree fruit is concentrated on Vineland Fine Sandy Loam which occurs in the south-eastern and in the north-western part of the township. Peaches are the dominant fruit crop, while on most farms a few acres are also devoted to cherries, pears, and sometimes grapes. Operations between 30 and 60 acres in size that are managed on a full-time basis are fairly common in the northern part of the township. On the other hand, tender fruit land in the south-eastern part has been greatly fragmented, and one finds a large number of part-time operations, many of which are only ten acres in size (Fig. 16B). Most of these small properties are held by recent immigrants from Europe. The majority are industrial workers who commute to St. Catharines. Typical farm incomes from these operations fall into the \$1,000 to \$3,000 range. Because of an absence of economies of scale, and the need to contract out much of the maintenance work, net returns generally are minimal. This factor, however, does not seem to deter these people from making considerable investments in their small operations. Young plantations established by both full and part-time fruit growers are not uncommon in Niagara township (Fig. 15A). Many of these small operations also produce vegetables, small fruit, or nursery products. In 1966, as many as 410 farmers reported the sale of vegetables, 162 reported small fruit, and 155 reported the sale of nursery products.

Jeddo Clay Loam and Lincoln Clay are two additional soil types that are of importance in the township. Because of the limited local relief of the area, and the poor internal drainage of these soils, this land is not suited for tree fruit. However, where drainage is satisfactory grapes are grown fairly extensively. Some of this land is also used for corn, feed grain, hay, and pasture. Many of the farms in this section of the township are livestock operations, specializing in hogs or beef cattle, with grapes as an additional enterprise (Fig. 16A, 15B). Small, part-time operations are less common in this area.

Land prices in the township range from \$1,000 to \$3,000 per acre, with an average price of \$2,094 per acre for the 35 sample farms. Although these prices do necessitate intensive land use and high returns per acre, they are the lowest prices for land in any part of the fruit belt. Furthermore, the limited prospects for urban development in the township, and the presence of a large number of part-time farmers who are not solely dependent upon their farm income, has in the past provided a measure of stability which is not characteristic of other parts of the region.

The future of fruit growing in Niagara appears more promising than in any other township. On the other hand, the question of the desirability of land fragmentation is debatable. Part-time fruit growing is very inefficient. Improper orchard management greatly adds to the disease hazard. The construction of homes on ten or twenty acre sites is just another form of strip development which makes efficient planning or the re-consolidation of such land virtually impossible.

In contrast, the full-time growers in the area are generally cautious investors. Their present and future production decisions are not governed by a desire to improve the agricultural conditions in the township, but by the profitability of their efforts and their investment.

6.7 Summary

Field observations made during the summer of 1968 indicate that fruit production in the townships of Saltfleet, North Grimsby, and Pelham has continued to deteriorate. Except for areas located above the escarpment in Saltfleet and North Grimsby, there is no evidence of new orchards or vineyards, and most of the remaining full-time fruit growers anticipate the eventual sale of their property, and hence are not prepared to make investments which they cannot recover. In all three municipalities, extensive residential development has occurred in recent years. Frequently, the land best suited for tender fruit growing has been taken out of production. If present trends continue, the disappearance of commercial fruit production from these areas is inevitable.

The township of Clinton, Louth, and Niagara are still important fruit-producing areas. In Clinton and Louth, incipient residential development and increasing land prices constitute a potential threat to the fruit industry. The recent adjustment of the eastern boundary of Louth, in which two fifths of the township's eastern section was apportioned to St. Catharines has already resulted in increased land prices in this area. Such land will be earmarked for eventual urban development, and long term agricultural investment will be effectively stifled.

In all parts of the fruit belt, conditions of uncertainty under which farmers operate are greatly aggravated by rising production cost and low fruit prices. These problems will be considered in Chapter VII.



A

Tender Fruit
Other Tree Fruit

Grapes

Market Garden

Other Uses*

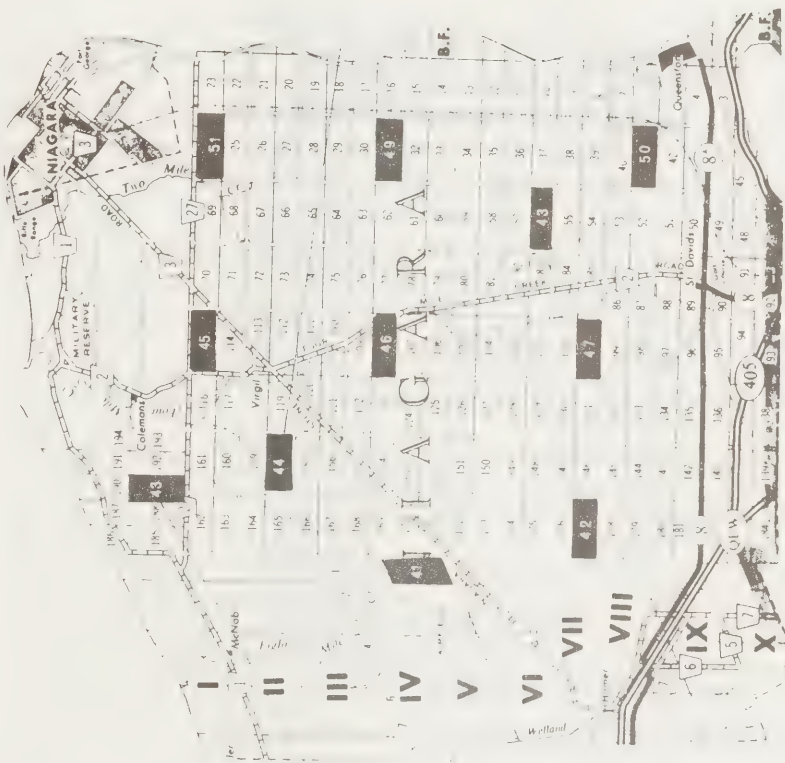
No. of farms in block

No. of part-time farms

No. of non-farm residences

* Mixed, Vacant, Bush, etc.

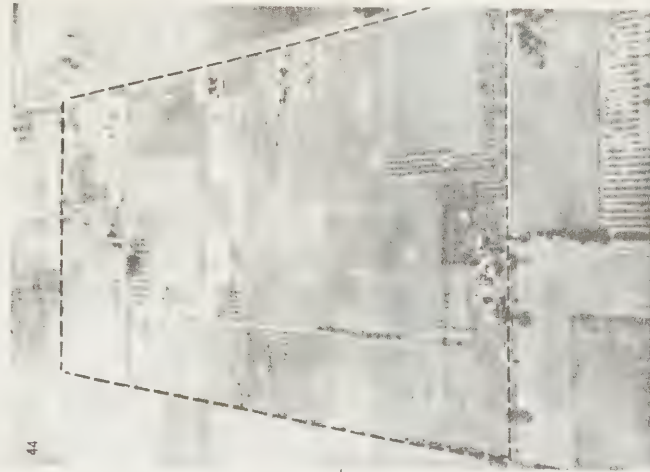
30%
28%
12%
20%
10%
5
3
3



LEGEND

P Peaches
G Grapes
C Cherries
Pa Pears
A Apples
V Vegetables
O Other
Mx Mixed
Io Idle Orchard
Va Vacant
Ind Industrial
F Farm House
PF Part-time
R Rural NF
Sub Subdivision

Figure 15
SAMPLE BLOCKS, NIAGARA.



B

Tender Fruit
Other Tree Fruit

Grapes

Market Garden

Other Uses*

No. of farms in block

No. of part-time farms

No. of non-farm residences

* Mixed, Vacant, Bush, etc.

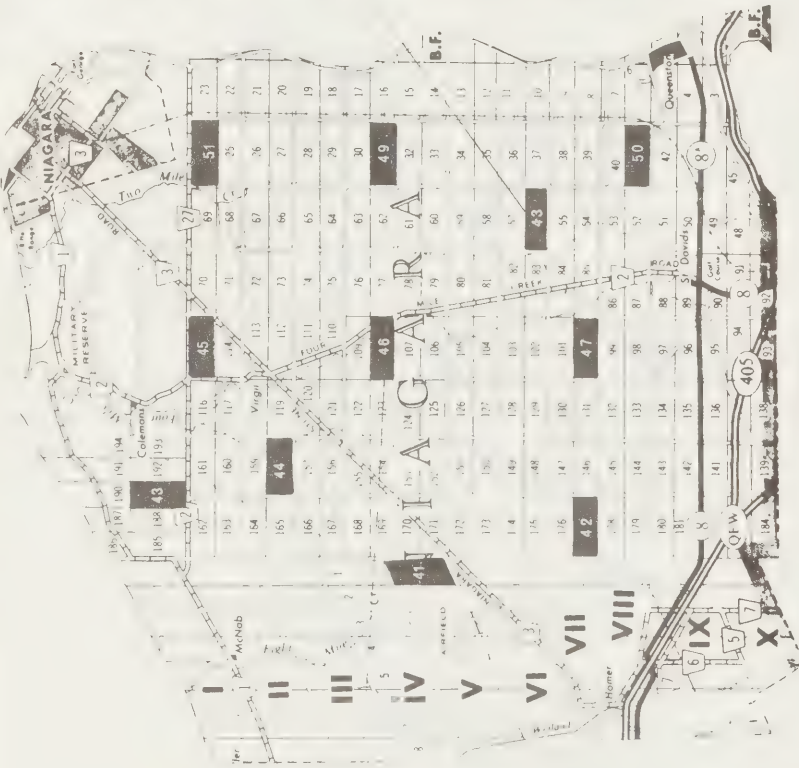
5%
5%
3%
35%
52%
5
5
1



B

LAND USE

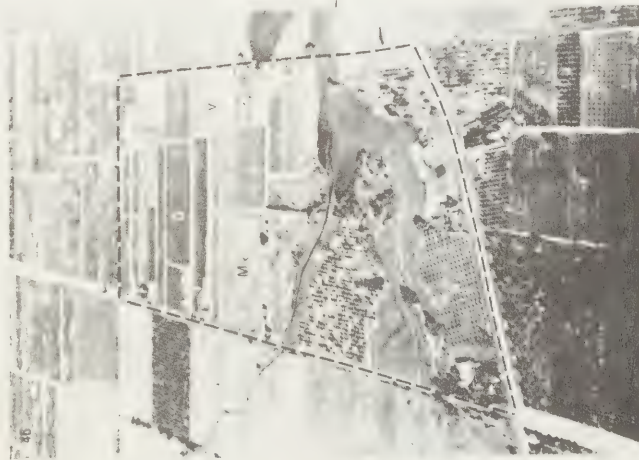
Tender Fruit 24%
Other Tree Fruit 10%
Grapes 15%
Market Garden 12%
Other Uses* 39%
No. of farms in block 4
No. of part-time farms 2
No. of non-farm residences 2
* Mixed, Vacant, Bush, etc.



LEGEND

P Peaches
G Grapes
C Cherries
Pa Pears
A Apples
V Vegetables
O Other
Mx Mixed
Io Idle Orchard
Va Vacant
F Farm House
PF Part-time
R Rural NF
Sub Subdivision
Ind Industrial

Figure 16
SAMPLE BLOCKS, NIAGARA.



A

LAND USE

Tender Fruit 16%
Other Tree Fruit 4%
Grapes 40%
Market Garden 0%
Other Uses* 40%
No. of farms in block 3
No. of part-time farms 2
No. of non-farm residences 3
* Mixed, Vacant, Bush, etc.

CHAPTER VII

PROBLEMS OF THE FRUIT GROWER

In the face of rapidly changing conditions and an ever increasing demand for land for urban and industrial uses, many people have expressed serious concern about the future of the Niagara Fruit Belt. Frequently a plea for rational land use planning and the preservation of the best land for agricultural production is coupled with this concern. While such measures may be imperative if the permanence of the fruit industry of the region is to be assured, the findings of this study suggest that in the past far too little attention has focussed upon the problems of the producer.

In Chapter V, it was shown that a large proportion of fruit growers have either become indifferent to the problem of the future of fruit production in their area, or they feel that the preservation of land for agricultural uses is not feasible. It is of fundamental importance to recognize that this indifference and frustration on the part of the farmer is not primarily the result of pressures brought upon him by competing uses for the land and by spiralling land prices, but rather that his attitude is a reflection of the unfavourable economic conditions under which he must produce and sell his product. The statement made by many fruit growers that farmers would not sell their land if they would receive a fair price for their product illustrates this point rather well. In the light of this consideration, the question that needs to be asked is not "can the fruit belt be saved," but rather "under what conditions are fruit growers prepared to undertake the kind of investment which would enable them to compete with other uses?"

The following consideration of land prices, production costs and product prices is addressed to this particular question of investment by fruit growers.

7.1 Spiralling Land Prices: A Disincentive to Farm Investment

It is proposed that under conditions of rising land prices but static product prices, the incentive on the part of the fruit grower to invest in farm improvements, new orchards, better equipment and machinery, and so forth, is being stifled by an increase in his opportunity cost and by conditions of uncertainty resulting from land speculation in his area. In many parts of the Niagara Fruit Belt, land prices have advanced beyond a level at which fruit production can compete effectively with other uses.

While precise income data for all fruit producers in each of the six municipalities are not available, the economic position of the average fruit grower can be considered here. The following data are based upon information provided by 56 full-time fruit growers.

Average Farm Size	35.3 acres
Average Acreage in Fruit	23.7 acres
Average Total Investment in Farm Structures ¹ and Equipment	\$17,000
Average Annual Cash Expenditures	\$11,167
Average Annual Gross Income	\$16,980
Average Annual Net Income	\$ 5,813

¹ Not including the value of the farm residence.

If the farmer's investment in buildings and equipment is rated at 6% per annum, his capital cost for that portion of his total investment is \$1,020, leaving a net income of \$4,793, or \$135.77 per acre on a 35.3 acre operation. Given this net return per acre, the price of land a farmer is prepared to pay can be estimated using the traditional formula $P = \frac{a}{r}$ where a = the annual net return per acre, and r = the capitalization rate. Thus $P = \frac{135.77}{0.06}$ or \$2,262, which means that the "average" producer can pay up to \$2,262 per acre of land for fruit production. In other terms, assuming that the total investment of an "average" operation is mortgaged at an annual rate of 6%, and that the price paid for the 35.3 acres of land was in excess of \$2,262 per acre, the net income of that particular operation would be insufficient to cover total capital costs; in farm accounting terms, returns to family labour would be negative. The following table illustrates that average land prices in many parts of the Niagara Fruit Belt are higher than \$2,262 per acre.

Township	Land Prices in Dollars per Acre (106 Farms)		
	Minimum	Maximum	Average
Saltfleet	2,000	6,500 ¹	4,312
North Grimsby	500 ²	8,000	3,420
Clinton	400 ²	5,000	2,103
Louth	1,000	8,000	3,037
Pelham	1,200	3,500	2,220
Niagara	1,100	4,000	2,094

¹ In some parts of this township, prices are as high as \$10,000 per acre.

² Prices quoted by farmers located above the escarpment.

Given these land prices, the average fruit grower would only be prepared to make further investments in his operation if he is located in one of the three municipalities with land prices below \$2,262 per acre, namely Clinton, Pelham, and Niagara.

Since many farmers own their land and hence have no real costs other than their annual cash operating expenditures and the cost of depreciation on buildings and equipment, the hypothesis that increasing land prices cause disincentives to invest in farm improvements will be examined briefly.

It is assumed that the average fruit grower is located in the Township of North Grimsby. He does not have a mortgage against his property. At an average land price of \$3,420 per acre, his 35.3 acres of land have a market value of \$120,726. He has \$17,000 invested in buildings and equipment. Thus his total farm investment is \$137,726. His annual net income again is assumed to be \$5,813. While this net income may be sufficiently high to assure the farmer a satisfactory level of living, the opportunity cost on his investment, if rated at 6% per year is \$8,263. Thus total annual capital costs exceed total annual net income. Under these conditions a farmer may well decide to sell his property and to live on the interest which the investment of the proceeds from the sale will yield.

The point at which a fruit grower operating under these conditions will cease to make production improvements is difficult to determine empirically, and will vary from one producer to another. Interviews with fruit growers located in areas of high land prices suggest that investment in farm improvements and particularly in new orchards is not undertaken if net income is consistently lower than capital costs. Similarly, under conditions where land prices and associated capital costs rise faster than net returns, a point will be reached where the former exceed the latter, and where heavy investment in farm improvements can no longer be justified. Fruit farms located below the escarpment in the townships of Saltfleet and North Grimsby generally illustrate this situation.

Since fruit growers will ultimately benefit from an appreciation in property values, this factor cannot be invoked to explain their apparent indifference about the future of the fruit belt. In the face of rising production costs, their demands are for more equitable product prices. These demands clearly have not been met, and many growers have lost confidence. If they are located in an area of high land prices, they frequently will maintain production for a certain period of time. However, the objective is no longer to achieve larger farm profits, but rather to realize speculative gains which may accrue if the sale of the property can be postponed. The incentive on the part of the farmer to make investments which might assure larger farm profits is stifled.

While here only the position of the "average" producer was considered, it is evident that in the region there are still a fair number of competitive and efficient operations with above average levels of income. However, if past and present trends continue, they will face a precarious and uncertain future.

7.2 Production Costs and Product Prices

A study undertaken by the Farm Economics Cooperatives and Statistics Branch of the Ontario Department of Agriculture showed that the average total cost of growing an acre of peaches was \$368 for the period 1954-1956. In a similar study in 1965, the total cost had risen to \$606, an increase of 67%. Over the same period of time, net returns per ton of peaches increased from \$15 in 1954-1956 to \$19 in 1965. Part of this increase was due to a slight increase in yields from 4.4 tons to 4.7 tons. Furthermore, 1965 was a less-than-average crop year, with the result that prices were somewhat higher than in previous years, and a larger proportion of the total crop was sold on the fresh market.¹

For other types of tree fruit as well as for grapes, the pattern is much the same. Production costs have increased at a much faster rate than product prices. For certain types and varieties of fruit, prices have remained more or less unchanged, and in some instances have even declined.

While the so-called price-cost squeeze is by no means unique to the fruit industry, operational adjustments aimed to increase farm profits are more difficult to achieve. In contrast to the dairy or hog producer who can expand his output in a relatively short time by increasing his quantity of livestock and his feed expenditures, the fruit grower

¹ Ontario Tender Fruit Growers' Marketing Board, *A Brief To the Federal Task Force on Agriculture*, April 1968, pp. 2-3.

who commits his capital to new orchards will not realize any significant returns for at least five years. Yet considerable additional investment is necessary during the pre-productive period of a new planting. Uncertainty about future product prices adds to the high risk involved in such investments.

Since the income of the individual producer is largely a function of the acreage in productive orchard, farm size in terms of the total area of land that is suitable for fruit is clearly a very critical factor. It has been suggested that a tree fruit operation should be approximately 50 acres in size, with 35 to 40 acres producing, and 10 to 15 acres in young orchards. For a profitable grape enterprise more land would probably be required. This study shows that the majority of fruit farms in the Niagara Peninsula do not have sufficient acreage.

A limited number of fruit growers have indicated that they are planning to devote more of their present acreage to fruit production. However, from the entire sample of 106 farms, only three growers indicated the recent purchase of additional land for the expressed purpose of expanding their acreage in fruit. Two of these people are grape growers located in Louth township, the third is a tender fruit producer in Clinton. In many parts of the fruit belt land, prices are too high to make this type of farm adjustment possible. The resulting dilemma is particularly acute for the small producer. The following comment was made by one full-time fruit grower in reference to some of his less prosperous neighbours:

"Obviously, what is hitting the small farmer around here, is the fact that his operation is too small. He doesn't have enough capital to expand, and he doesn't like the idea of borrowing a lot of money, so he goes and gets another job. Once he has another source of income he usually loses the incentive to expand and to re-invest in his farm."

Notwithstanding the problems created by urban pressures, high land prices, rising production costs, and the inability of many small farmers to expand, the majority of fruit growers feel that price uncertainty created by increasing volumes of imported fruit constitutes the most serious problem confronting them. The following comments of fruit growers clearly reflect this concern.

"It has taken us thirty years to build up a market for fruit in this country, but our government doesn't care. It allows subsidized imports from Australia and the United States to come into the country. Under these conditions we simply cannot compete."

"I would say that our major problem right now is cheap imports of canned fruit from Australia. I understand that their canned fruit for export is subsidized at a rate of \$2.00 per case. Yet, their own fruit industry is protected by tariffs that are much higher than the protection given to Canadian producers."

"Imports, mainly from Australia are cutting up our markets. It seriously affects our canning industry, they have a hard time competing with these low prices. Of course, peach growers are hit hardest as a result."

"Our major problem relates to marketing and costs of production. We are told to compete or to get out. How can we compete with subsidized imports?"

"We could triple our production of fruit and still not meet the total demand of this country, but our government is dedicated to low food prices. Where it comes from doesn't really seem to matter that much."

"You are talking about saving the fruit belt. That's alright, they can save all the land they want, just as long as they don't go around telling the farmer what he can do with his land. We've had it — up to our necks. Give us the markets to which we ought to be entitled and you won't have to worry about the land being used for other things."

"The government collects all kinds of revenue from the sale of Canadian wine, yet, for the life of me, I can't see why they allow thousands of tons of Californian grapes to come into this country every year. These imports mean a loss to our own growers, they also mean a loss in revenue to the government, because a lot of these grapes are used for home wine-making which isn't taxed."

Figures released by the Dominion Bureau of Statistics substantiate the comments made by farmers. In 1958, the total Canadian pack of canned peaches was 56 million pounds. This volume declined to 15.7 million pounds by 1967. Over the same period of time, imports of canned peaches increased from 18.3 million pounds to 65.9 million pounds in 1967. The Canadian pack of canned pears has varied between 26 million pounds in 1958 and 38.5 million pounds in 1966. In 1967, this volume was down again to 25.7 million pounds. Imports of canned pears have risen steadily from 4 million pounds in 1958 to over 10 million pounds in 1967.

In a recent statement issued by the Ontario Tender Fruit Growers' Marketing Board² concern is expressed about the effects upon the Canadian fruit industry of low-priced imports from Australia and the United States.

"Australian imports have increased from practically nothing in 1960 to 25 million pounds of canned peaches, almost 7 million pounds of canned pears, and nearly 10 million pounds of canned mixed fruit in 1967. The period of greatest imports is July, August and September — our Ontario pack time, and in the last three years extremely low 'special' prices have been in effect in stores. The low store prices are reflected in low brokers' prices, and Ontario and British Columbia canners are caught in a squeeze which reflects back to the grower level. To further complicate conditions for the fruit industry, the Canada-Australia Trade Agreement provided that Canada's customs regulations in regard to "dumping" did not apply to imports from Australia."

The same report indicates that producers of sour cherries may also be affected by the vagaries of uncertain markets.

"A surplus production of sour cherries in the United States in 1964 and 1965 resulted in disastrous prices for New York and Michigan growers and correspondingly low prices on imports of frozen cherries into Canada. The light crop years of 1966 and 1967 removed the problem temporarily, but 1968 can be as serious a problem to Ontario growers as 1964 — when a subsidy of \$300,000 was paid to Ontario growers rather than impose a value for duty under the Customs Act on imports (and thereby risk the possible displeasure of the United States."

² *Op. Cit.*

"The above events have reduced confidence in the entire industry. The previous lack of interest in the industry from Ottawa on trade matters gives great cause for concern for the future and this can only be restored by positive action now."

Despite considerable scope for expansion of the Canadian grape industry, Canada is an "importing" nation of grapes and grape products.

In 1967, the Ontario crop was 65,000 tons of grapes, of which 11,900 tons were exported to the United States, while 2,000 tons remained unharvested due to lack of markets. Canadian grapes for export were subjected to a United States duty of \$7.00 per ton, yielding lower returns to the local grower than if they could have been sold on the home market. At the same time, in 1967 a total of 130,000 tons of Californian grapes entered Canada free of duty. Approximately one-third of the imported product was made into home-made wine which is free of sales and excise taxes and government regulations.³

These and other statistics suggest that grape growers are confronted with the same needless market uncertainties as other fruit producers.

It is not within the scope or purpose of this study to prescribe Canadian Trade Policy with respect to the imports and exports of fruit products. However, one cannot over-emphasize the point that the persistence of these conditions constitutes a serious disincentive to productive investment on the part of fruit growers. In the light of these considerations one should not accept the naive assumption that the protection of land alone will guarantee the permanence of the fruit industry in the Niagara Region.

High land prices, rising costs of production, and unfavourable markets are serious sources of disincentive to farm investment. The future of the fruit industry will not depend upon arbitrary action, but rather upon the economic realities with which the producer must cope.

³ Ontario Grape Growers' Marketing Board, *A Brief to the Federal Task Force on Agriculture*, May 1968.

CHAPTER VIII

SOCIO-ECONOMIC PARAMETERS IN FARM PERFORMANCE

This study is an outgrowth of the research conducted in the mixed farming areas of the Niagara Region in 1967. It concerns a detailed investigation of 43 commercial farms in Seneca Township.¹

As economic development proceeds, it is customary to expect a decline in the relative importance of the agricultural sector. Accompanying this change is migration of people from the farms to the cities and an increase in the number of part-time farmers. The Niagara Region is not an exception to this pattern.

In 1963, agriculture accounted for only 3.5% of total production, a figure which is expected to decline to 2.6% by 1970.² Similarly, employment in agriculture has been decreasing steadily, and by 1970 is expected to account for only 4.7% of total employment in the region. Parallel with these changes has been an overall decline in the area of farmland, and in the total number of commercial farms. At the same time, the remaining commercial farms have expanded in size and in total farm capital. The gross value of agricultural production and the index of physical volume of agricultural production have been increasing.

While these regional trends may give some cause for optimism about the progress of agricultural adjustment, very real differences in agricultural conditions within the region tend to be obscured. Estimates of values of agricultural products sold per acre of improved land based upon 1966 Census data provide some indication of the performance disparity existing within the region. The value of farm products sold per acre of improved land based upon 1966 Census data provides some indication of the performance disparity existing within the region. The value of farm products sold per acre varied from \$35 for the Township of Sherbrooke, to \$225 for the Township of East Flamborough. On a county basis, Brant ranked highest with \$158 followed by Wentworth with \$119, Lincoln with \$59, Haldimand with \$52, and Welland with \$49. On the basis of this index, it is clear that the counties of Brant and Wentworth rank considerably above the other three. Brant County generally has lighter and better-drained soils which have favoured the production of tobacco and cash grains on a large scale. Returns per acre of land are high, justifying greater capital expenditures in farm improvements, modernization, and farm consolidation. As a result, although land values are relatively high, agriculture can compete effectively with other uses, and severance of land for non-farm purposes as well as speculation is less typical than in many parts of the region.

The better performance of Wentworth County can be attributed to a large number of market gardens and to high-income dairy farms. Furthermore, land which has been taken out of production, either for purposes of afforestation, as has been the case for

¹ Darnel, B. W., *Socio-Economic Parameters in Farm Performance*, M.A. Thesis, McMaster University, Hamilton, 1969.

² *Niagara 1966*, Department of Economics and Development, (Toronto, 1967) p. 14.

large acreages in Beverly, or as a result of urban expansion, is no longer classified as "improved land," hence income is more likely to be attributed only to land which is actually under cultivation.

The remaining three counties, namely Haldimand, Lincoln and Welland may be considered the agricultural problem areas of the region. Here, one generally finds very little progressive agricultural development, while at the same time, land values and land speculation have continued to increase. The area has become, to use Gertler's phraseology, "a happy hunting ground in which everybody believes he has a chance to make a killing."³ Municipalities in these counties generally still have a large number of farms that are classified as commercial in the Census. In reality, however, the truly commercial establishments in each township form a minority. Many farms are operated on a part-time basis, either by farmers who now hold a full or part-time job off the farm, or by people from the city who have acquired a small farm to combine their city income with the amenities of country living. They also anticipate large profits from the eventual re-sale of their property. Quite a number of farms are owned by immigrant farmers from Europe. Some of these people, notably the younger ones have prospered, and have been able to establish successful operations, while others operate very inefficiently and are handicapped by chronic financial problems.

The overall agricultural situation does not appear very promising. If present trends continue, and the economic constraints under which farmers must operate are further aggravated by artificially inflated land values, the critical question a few years hence will not be "how can agricultural production in the area be maintained or increased?", but rather "what should be done with over half a million acres of farmland that have been taken out of production prematurely?"

While this paper is not addressed to the specific question of future land use in the area, it is suggested that the present economic performance of the full-time farmer, his manner of response to economic change, and his opportunities to maintain or increase his level of income, are crucial variables in predicting the pattern of agricultural development that is likely to occur. In this context, the following questions are raised:

1. What are the factors underlying widely-observed variations in farm incomes and economic performance of full-time operations?
 - a. How important are differences in farm type and location with respect to soil type?
 - b. What is the role of biographical characteristics, attitudes of farmers, and differences in farm practices in relation to levels of performance.
2. What is the nature of economic incentives in farming?
 - a. How do these affect farm adjustment?
 - b. How do these relate to the persistence of the chronically inefficient low-income farm?

³ Gertler, L. O., "Regional Planning and Development" in *Regional and Resource Planning in Canada*; Holt, Rinehart and Winston of Canada, Ltd., Toronto, 1967.

3. What is the percentage of economically viable or potentially viable farm operations?
4. What are the implications of research findings for the future of farming in the region?

8.1 Research Design and Methodology

Seneca Township occupies a roughly central position within the Niagara Economic Region (Fig. 17). Agricultural conditions are most nearly "average" with respect to the overall characteristics of the region. Although the area falls within the urban shadow of the City of Hamilton, and has a fair number of part-time farmers, severance of land for non-farm purposes has been controlled, and farming is still the predominant activity.

In 1966, Seneca had a total of 260 "census farms." Since this study was primarily concerned with full-time operations, this figure, which includes a large number of part-time farms, could not be treated as the statistical population from which to draw the sample. Instead, selection was made from township records. It was assumed, firstly, that any individual, regardless of the amount of land he owned would not be listed as "farmer" if he had another occupation and held a full-time job off the farm. Secondly, it was assumed that a minimum of at least 95 acres of land was required to operate a farm on a full-time basis and to achieve an adequate net income. On this basis, a total of 146 entries qualified as potential full-time farmers. From this list, a sample of 50 farms was chosen on a random basis.

The distribution of sample points is shown in Figure 18.

Two basic types of data were required for this study:

1. Data pertaining to the physical and economic characteristics of each farm.
2. Data pertaining to the farmer and his family.

A list of all economic and social variables for which data were obtained is given in Table V.

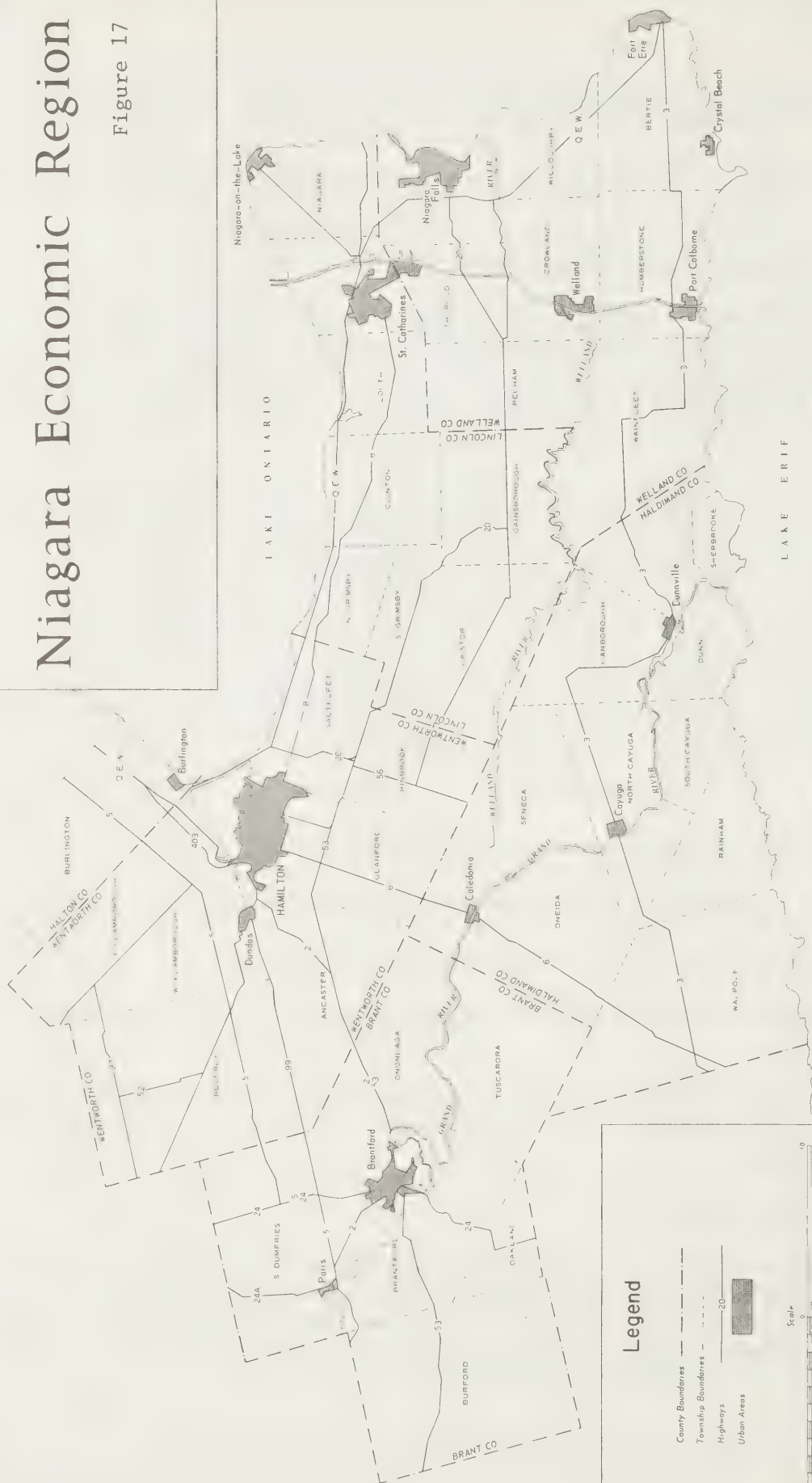
Data were collected by means of a one-call confidential survey questionnaire of which a copy is included in the Appendix. Interviews yielded a total of 43 usable sets of observations.

8.2 Data Analysis

To achieve approximate comparability of farms and to obtain an index of performance which measures output on the basis of all important inputs, multiple regression analysis was used to estimate a standard production function. Residual values, which represent the difference between actual and predicted values of gross income, were employed to group farms into different performance categories.

Niagara Economic Region

Figure 17



The equation for the production function is based upon the formula $Y_a = f(A_a, C_b, C_e, C_l, L_y, E)$

where:

Y_a = Output, gross income in dollars

A_a = Acres of cropland (adjusted to Class 1)

C_b = Capital invested in farm buildings

C_e = Capital invested in equipment and machinery

C_l = Capital invested in Livestock

L_y = Labour, total man hours per year

E = Cash operating expenses

It is assumed that this equation includes all important measurable variables that influence output. Since management is not included in the equation, it is assumed that a large proportion of the unexplained residual reflects the managerial component and related social factors.

The residual value (MS) is obtained by subtracting the actual gross income (Y_a) from the predicted gross income (Y_p), thus $MS = Y_a - Y_p$.

When MS is large and positive superior performance is indicated.

When MS equals zero or nearly so, average performance is indicated.

When MS is large and negative, inferior performance is indicated.

Data pertaining to each of these seven variables used in this analysis exhibit approximately normal distributions. Simple correlation coefficients and levels of significance are listed in Table VI. It will be noted that all variables are significantly related to gross income. In all but one instance, relationships among independent variables are also significant.

To obtain an additional index of performance, returns to family labour⁴ were calculated for each operation.

8.3 Results of Analysis of Economic Data

Summary statistics (Table VII) of all major economic variables give some indication about the range of variations in economic structure of the farms included in the sample. Farms range in size from 98 acres to a maximum of 643 acres, with an average size of 201 acres. Total farm capital ranges from \$31,000 to \$153,000 with a mean investment of \$71,000. Gross annual incomes range from a low of \$3,000 to a high of \$56,000 with an average of \$10,000, and returns to family labour range from a negative return of — \$2,981 to a positive return of \$5,280, with a mean of \$1,749.

⁴ Returns to total annual investment (Capital Cost estimated at 6% of total farm investment plus cash operating expenses).

SENECA TOWNSHIP
LOCATION OF SAMPLE POINTS

Figure 18

- Interviewed
- Not Interviewed



TABLE V

LIST OF 68 ITEMS OF INFORMATION

1	Sample Number	35	Son committed to farm
2	Farm Type	36	Marital Status of Farmer
3	Soil Type	37	Wife of Farmer, Background (Farm, Non-farm)
4	Total Acreage	38	Wife, Formal Education
5	Acres Cropland	39	Number of Children
6	Acres Cropland Adjusted	40	Family Achievement Score
7	Land Value per Acre	41	Attitude toward Credit
8	Total Investment in Land	42	Attitude toward Education
9	Total Investment in Buildings	43	Future in Farming
10	Total Investment in Machinery and Equipment	44	Attitude toward New Ideas in Farming
11	Total Investment in Livestock	45	Attitude toward Farmers Unions
12	Total Farm Capital	46	Farm Goals
13	Total Man Hours per Year	47	Farm Organization and Extension Involvement Score
14	Cash Operating Expenses	48	Readership Score
15	Capital Cost	49	Expectation Model for Product Prices
16	Total Operating Cost (Cap. Cost and Cash Op. Exp.)	50	Expectation Model for Factor Costs
17	Total Farm Expenditures (Cash Op. Exp, Interest, Deprec.)	51	Expectation Model for Govt. Programs and Policies
18	Gross Farm Income	52	Use of tested Grain for Seeding
19	Net Farm Income (Gross Income less Total Farm Expendit.)	53	Use of treated Seed
20	Returns to Family Labour (Gross Inc. - (Cap. Cost + C. Exp.)	54	Use of Fertilizer on Hay and Pasture
21	Capital Turnover	55	Basis for Decisions on Types and Quantities of Fertilizer
22	Gross Income per Acre Adjusted Cropland	56	Method of Weed Control
23	Hourly Returns (Ret. to Fam. Lab. div. by Tot. Man Hours)	57	Use of Soil Test
24	Age of the Farmer	58	Correction of Soil Acidity
25	Place of Birth	59	Correction of Surface or Internal Drainage
26	Formal Education, Total Number of Years	60	Time of Year Equipment is repaired and overhauled
27	Agricultural Education, No. of Years	61	Storage of Surplus Hay and Grain
28	Farm Background	62	Type of Farm Record
29	Number of Years of Non-farm Experience	63	Method of Decision Making
30	Number of Years of Farm Management Experience	64	Farmer's Assessment of Usefulness of Information
31	Acquisition of Farm (inherited or bought)	65	Solution of Farm Problem
32	Mortgage on the Farm	66	Subjective Assessment of Farmer as a Manager
33	Joint Operation (eg. partnership)	67	Status of Farmer (full-time, part-time)
34	Equipment and or Labour Sharing Agreement	68	Number of Managers on Farm

TABLE VI
SIMPLE CORRELATION COEFFICIENTS FOR
SELECTED ECONOMIC VARIABLES

Variables Compared	Value of R	Level of Significance ¹
Acres (6)/Buildings (9)	0.3915	98%
Acres (6)/Equipment (10)	0.4644	99%
Acres (6)/Livestock (11)	0.4395	99%
Acres (6)/Hours (13)	0.3194	95%
Acres (6)/Op. Expenses (14)	0.3255	95%
Acres (6)/Gross Income (18)	0.3583	98%
Buildings (9)/Equipment (10)	0.4707	99%
Buildings (9)/Livestock (11)	0.3466	95%
Buildings (9)/Hours (13)	0.4259	99%
Buildings (9)/Op. Expenses (14)	0.2732	-
Buildings (9)/Gross Income (18)	0.3251	95%
Equipment (10)/Livestock (11)	0.5174	99%
Equipment (10)/Hours (13)	0.5202	99%
Equipment (10)/Op. Expenses (14)	0.6067	99%
Equipment (10)/Gross Income (18)	0.6441	99%
Livestock (11)/Hours (13)	0.6473	99%
Livestock (11)/Op. Expenses (14)	0.6351	99%
Livestock (11)/Gross Income (18)	0.6724	99%
Hours (13)/Op. Expenses (14)	0.6243	99%
Hours (13)/Gross Income (18)	0.6576	99%
Op. Expenses (14)/Gross Income (18)	0.9863	99%

¹ Correlation Coefficients are significant at the 95, 98, and 99% level when the value of R exceeds 0.304, 0.358, and 0.393 respectively.

TABLE VII
SUMMARY STATISTICS
(43 Farms, 20 Variables¹)

	Mean	St. Dev.	Minimum	Maximum
4 Total Acres	201.9	103.3	98.0	643.0
5 Acres Cropland	170.0	71.6	60.0	350.0
6 Acres Cropland Adjusted	146.6	59.3	53.0	305.0
7 Land Value Per Acre	\$ 157.5	23.7	109.0	210.0
8 Capital Land	\$31,010.8	14,757.6	15,600.0	91,975.0
9 Capital Buildings	\$12,060.2	4,992.4	3,532.0	24,920.0
10 Capital Equipment	\$14,822.0	6,402.3	2,500.0	39,500.0
11 Capital Livestock	\$13,408.4	5,381.6	3,840.0	26,900.0
12 Total Farm Capital	\$71,302.3	24,944.9	31,220.0	153,130.0
13 Man Hours Per Year	4,481.7	1,603.1	2,062.8	10,483.2
14 Cash Operating Expenses	\$11,853.2	8,282.0	1,780.0	44,659.0
15 Total Farm Capital x 0.06	\$ 4,278.1	1,496.7	1,873.2	9,187.8
16 Total Operating Cost (14 + 15)	\$16,131.4	9,217.9	3,653.2	52,792.6
17 Total Farm Expenditures	\$13,243.3	9,186.8	2,580.0	50,815.0
18 Gross Farm Income	\$17,299.0	10,141.9	3,056.0	56,212.0
19 Net Farm Income (18 – 17)	\$ 4,056.5	1,905.7	476.0	7,700.0
20 Returns to Family Labour (18 – 16)	\$ 1,168.5	1,749.7	–2,981.4	5,280.0
21 Capital Turnover	4.9	1.9	1.6	10.2
22 Gross Income per Acre Adjusted Cropland	\$ 131.5	101.4	34.0	641.0
23 Hourly Wage (20 ÷ 13)	\$ 0.25	0.38	– 0.60	1.10

¹ Items No.1,2, and 3 omitted from this table are the Sample Number, Farm Type, and Soil Type.

In view of these very considerable farm-to-farm differences in physical size as well as total investment, differences in gross annual incomes are inevitable, and are not surprising. In fact, results of the regression analysis show that 97.8% of all variation in farm income is accounted for in terms of variations among farms in the six critical inputs, namely acreage of cropland, capital invested in buildings, machinery, and livestock, annual labour inputs, and cash operating investment.

The conclusion based upon this observation is self-evident. The difference between the low-income farm and the high-income farm is not primarily a function of differences in management, but of differences in farm size as measured in terms of total investment.

Notwithstanding the seemingly all-exclusive importance of economic factors of production as determinants of levels of farm income, residual values ranging from +3,610 to -\$4,049 do suggest some farm-to-farm differences in production efficiency and performance. It has been generally in vogue to attribute these differences to management, and to make the quality of management a function solely of managerial ability. Thus it would follow that a low level of efficiency is indicative of poor management, and that superior performance indicates superior management. While on the surface, this argument may be appealing, it is at best an oversimplification of a complex problem. Still more pernicious are the doctrinal answers which are provided to explain the persistence of the chronically inefficient low-income farm, and which allegedly explain the slow rate of acceptance of new ideas and farming practices by more efficient operators. In this context, farmers are frequently accused of economic perversity, ultra-conservatism, and an unwillingness to respond to economic change. These are attributes which are equated with a farmer's rural background, his limited education, age, etc., and a set of attitudes which supposedly are unique to farm people.

In order to assess the relevance of these hypotheses, and to interpret the unexplained residual, all 43 farms in the sample were divided into four performance groups on the basis of residual values. The standard error of the estimate of \$1,572, indicated by regression results, was used as a group interval for farms falling into categories II and III. All farms with a residual value above or below these categories, are placed into group I and group IV respectively. Thus farms in group I are those with a superior level of performance, while the opposite is true for farms in group IV. Residual values for each of the 43 farms, and the relative position of each farm along the performance scale are given in Table VIII.

8.4 Performance Differences as a Result of Variation in Farm and Soil Type

Since this study was concerned with performance variations among a representative group of full-time farms within a given area, no attempt was made in the selection of the sample to achieve homogeneity with respect to farm type or location on a particular soil type.

The sample contains a total of 16 dairy farms, two beef operations, two hog operations, and 23 mixed farms.⁵ These are distributed over the three principal soil types, Brantford Clay Loam, Oneida Clay Loam, and Haldimand Clay (Fig. 19).

⁵ This group includes all farms with two or more major enterprises, e.g. dairy-beef farms, hog-beef farms, etc.

In view of the relatively small sample, the hypothesis that one farm type is more profitable than another, or that location on one particular soil type results in a different cost-return ratio than location on another, could not be empirically tested. However, residual values suggest that both of these factors may be relevant. It was found that only 12% of the dairy farms have negative residuals as compared to 61% for dual or multi-enterprise mixed farms.

Similarly, it was found that 75% of the 20 farms comprising groups III and IV are located on Haldimand Clay, whereas only 52% of the 23 farms making up groups I and II are located on this soil type of somewhat lower productivity.

The sample contains a total of 14 farms which are owned by immigrants that have become established in the township over the past two decades. It is of interest to note that all but two of these farms are located on Haldimand Clay. The inference is that most of these people had very little initial capital to purchase a farm and to become established, and hence gravitated toward areas where relatively low-priced farms were available. In view of the fact that many of the farms bought by these people had also been neglected, and in view of the seemingly higher costs of production associated with that particular soil type, it is not surprising that many of these operations are still inefficient.

The following limited conclusions are possible:

1. That some performance differences relate to enterprise type and soil type.
2. That higher returns on Oneida and Brantford Clay Loam have encouraged greater investment and a greater degree of specialization.
3. That a larger number of inefficient operations are associated with the less productive soil type
 - a. because numerous farms owned by immigrants are under-capitalized
 - b. because of a lesser degree of specialization
 - c. because of higher production costs, and consequently lower profit margins and less incentive to invest in farm improvements.

While the precise nature and the effects of production cost variations were not fully established, it is suggested that these factors will play an increasingly important role in influencing the investment behaviour of farmers, and in widening the gap between stagnant and progressive farming areas. Because of the obvious implications for area development, this subject merits further research.

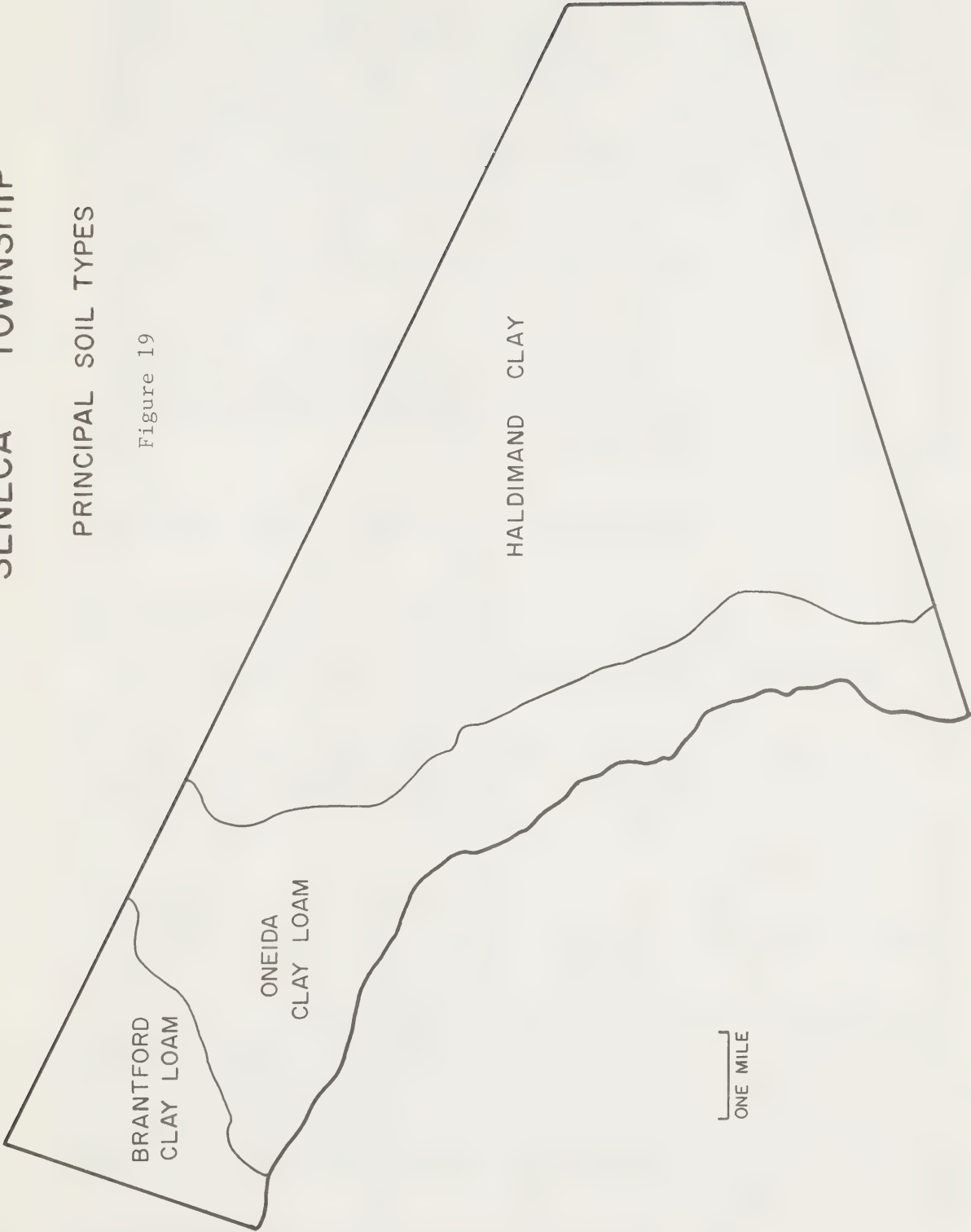
8.5 Biographical Characteristics, Attitudes of Farmers in Relation to Levels of Performance

As pointed out already, failure on the part of many farmers to adopt the latest farming methods and techniques and to respond positively to changing economic conditions has frequently been equated with the age of farmers, their limited levels of education,

SENECA TOWNSHIP

PRINCIPAL SOIL TYPES

Figure 19



and their peculiar values and attitudes. If these hypotheses are valid, one would expect a distinct relationship between levels of performance and these variables.

Farmers included in the sample range in age from 28 to 67 with an average age of 43.5. If older farmers are generally less progressive and more conservative, such behaviour ought to be reflected in levels of performance. Empirical evidence does not support this assumption. With an average age of 47, farmers in group II are on an average older than farmers in groups III and IV. It was found that only 28% of farmers in group II were below the sample mean age of 43.5 as compared to 60% of farmers in group III. Older farmers, while they may tend toward more conservative behaviour, also have had more experience, and are able to make decisions which are the most profitable in the long run and which involve fewer risks. Farms owned by older people are more likely to be in a production equilibrium than farms owned by younger people who are still undertaking programs of expansion. Many older farmers have sons who are interested in farming, in which case a decline in production and in the level of performance is unlikely. Here one may note that a total of 15 farmers in the sample have sons in the 18 to 24 age category. In 11 cases, the son is interested in farming, and in nine cases sons have committed themselves to farm. Several of these young people hold diplomas from agricultural schools, while others have expressed a desire to obtain such training before embarking upon a career in farming.

Assumptions about the importance of education to success in farming are hardly less categorical than those made about the age factor. Farmers interviewed were found to have an average of 10.2 years of formal schooling. The mean for each of the four performance groups is 9.2 for group I, 10.3 for groups II and III, and 10.4 for farmers in group IV. One need hardly point out that this pattern is contrary to what one would normally expect. Ironically enough, it was also noted that the farmer in the sample with the highest level of performance has had only five years of formal education.

While young people who are planning to farm today are well advised to get as much education as they can, and preferably to obtain some specialized agricultural training, it is clear that many older farmers who did not have the same educational opportunities did become successful farmers. In this context, educability rather than years of schooling would appear to be the critical variable.

Other biographical variables that were considered included place of birth, years of managerial experience, years of non-farm experience, and marital status. Reference has already been made to the fact that a larger number of operations owned by immigrants have negative residuals. The inference is not that these people are poorer managers, but rather that lower levels of performance frequently are attributable to financial difficulties associated with the process of establishment, and farm improvement and expansion. A number of younger farmers in this group are very successful and belong to the upper two performance categories. In part, this relates to the fact that they have been able and willing to make extensive use of farm improvement loans, particularly junior farmer loans, and consequently have been able to establish economically viable and balanced operations in a relatively short period of time.

The variable, years of managerial experience, was not found to relate meaningfully to levels of performance. In contrast, it was noted that a decline along the performance

scale is associated with a marked increase in the number of years farmers have worked at jobs other than farming. The means for farmers in performance groups I to IV are 1.4, 1.9, 7.2, and 8.4, respectively. This variable is strongly correlated with the manner in which farmers became established. Managers who were born and raised in the local area and who either inherited the parental farm, or who were aided by their parents in becoming established, were found to have on an average less than two years of non-farm experience. In contrast, most immigrant people from other areas who own farms in the township usually have had several years of non-farm experience. This is explained by the fact that in these cases the purchase of a farm generally was preceded by several years of non-farm employment. This was necessary for the accumulation of sufficient capital for a down payment. This observation provides further support for the hypothesis that several of the more recently established farms are inefficient because of the inadequate capital structure of these operations.

Past research has focussed very limited attention upon the role of the farm family as a source of economic motivation. To assess the relevance of this factor, the marital status of farmers and family achievement scores were considered. Six of the farmers in the sample do not have strong family commitments. Four are unmarried and two are separated from their wives. In every case, production function residuals are negative. While this observation does not necessarily support the hypothesis that family obligations are essential to success in farming, it does suggest a difference in needs and aspirational levels between the farmer who supports a family and the farmer who does not.

To obtain some indication of the extent to which the farm family constitutes a source of motivation, a subjective score was used. The family achievement score was based upon a composite rating of levels of living, past achievement, the family's involvement in community affairs, and upon an expression of the family's plan for the future. This score was found to be positively correlated with levels of performance, and to a lesser extent with the level of education of both husband and wife. The inference is that family needs and aspirational levels are of considerable importance in determining the manner in which the farm is used to meet income demands generated by the family.

A series of questions designed to assess the attitudes of farmers on several pertinent issues yielded a highly variable response pattern, but failed to yield any concrete evidence which would suggest the existence of a relationship with levels of performance.

Farmers were asked about their attitudes and opinions on the following subjects: the use of credit in connection with their own operation, new ideas and improvements in farming, the importance of education to success in farming, and the nature of opportunities in farming today.

Considerable variations were noted in the actual use of credit. However, all but two farmers felt that credit is essential to the successful operation of a farm. Little substance was found in support of the idea that farmers generally are credit shy because of a deep-seated aversion to borrowed capital. While some farmers might benefit from a more liberal use of credit, their unwillingness to assume additional risks

should not be interpreted as an adherence on their part to outmoded values and attitudes, but rather as a reflection of the limited economic incentives and rewards in farming.

A somewhat similar conclusion applies to the observation that very few farmers are innovators, even though most of them are positively inclined and receptive toward new ideas in farming. Acceptance or non-acceptance of new ideas and techniques in farming was not found to be governed by a set of peculiar local attitudes, but would seem to be primarily a function of the nature and certainty of additional profits which might accrue to the farmer as a result of the change.

In this context, farmers were also questioned about a number of standard farm practices. The results are listed in Table IX. It will be noted that positive relationships with levels of performance are evident in connection with the use of information from soil tests as a basis for decisions on types and quantities of fertilizer, the use of lime to correct acidity, and the maintenance of farm records. For as many as five items, the percentage of farmers using a certain practice is exactly the same for farmers in group I and group IV, while it is either higher or lower for the other two groups. For variable No. 57, the relationship is negative; that is, a higher percentage of farmers in group IV have had their soil tested than farmers in group I.

Additional probing questions were used to ascertain the bases for farmers' decisions to adopt certain practices and to reject others. Again, economic considerations play a decisive role.

Farmers who do not generally use tested grain for seeding, explained that farm-grown seed will yield comparable results, as long as the practice is not carried to extremes and the seed stock is occasionally renewed with certified seed.

Few farmers seem to be convinced that fertilizer quantities recommended on the basis of soil analyses are justified in terms of the additional returns resulting from higher applications. They tend to argue, and not without reason, that this decision cannot be made in a soil laboratory, but is more appropriately based upon their own field observations.

Carefully conducted experiments have amply demonstrated the benefits of lime in the correction of soil acidity. Yet despite the fact that subsidies are provided to encourage the use of lime, few farmers, including those who have used lime, seem to be convinced that resulting marginal returns justify the additional expense.

Farmers are offered subsidies to install tiles for underdrainage, yet only three farmers in the sample have taken advantage of such assistance. Most farmers feel that surface ditches are adequate to provide the necessary drainage. One may surmise that more farmers would install underdrainage if this less costly alternative did not exist, or if the installation of tiles would render the land suitable for the production of more profitable crops.

TABLE IX
FARM MANAGEMENT PRACTICES BY PERFORMANCE GROUPS

Management Practice	Performance Group			
	I	II	III	IV
	percentage per group			
(52) Use tested grain for seeding	80	67	73	80
(53) Use treated seed	100	100	93	80
(55) Use soil test to decide on quantities and type of fertilizer	40	61	27	20
(56) Use chemical weed control	100	78	93	100
(57) Have had soil tested	60	94	80	80
(58) Use lime to correct acidity	66	88	53	25
(59) Corrected drainage				
a. surface ditches	100	75	89	100
b. tiles	0	25	0	0
(60) Maintenance of Equipment				
a. during off-season	20	61	67	80
b. as required	80	39	33	20
(61) Store surplus hay and grain	20	33	13	20
(62) Keep written farm records	100	100	67	80
(63) Make important production calculations on paper	80	67	53	80
(34) Have agreement with other farmer to exchange labour, and or equipment	40	16	0	0

In response to the question "How much education do you need to be a farmer today?" about half of the farmers interviewed felt that education is very important to success in farming. Another 40% felt that education is of some importance, while 9% said that education was of little consequence to success in farming. No relationship with levels of performance was evident. In many cases, the response given by farmers was a reflection of their own educational background, that is, farmers who had obtained several years of secondary education attached generally greater importance to the role of education than farmers who completed only grade school.

Contrary to what one might expect, a large number of farmers felt that there is a future in farming for young people today. Forty-two per cent felt that there is definitely a future in farming. Another 42% felt that there is a future for a limited number of young people with the proper qualifications and the necessary capital. Only 16% stated that farming holds no future and that they would not encourage anyone to farm.

An examination of selected variables pertaining to farmers' biographical characteristics, their attitudes, and their management practices in relation to levels of performance suggests the following conclusions.

1. Biographical characteristics appear relevant to the extent to which they influence the farmer's personal and family needs and aspirations. If family goals are ambitious and materially oriented, responsive action will likely be directed to satisfy these ends. If this source of motivation is weak or absent, farm goals will be less ambitious.
2. Attitudes of farmers were found to be neither "peculiar" nor "outmoded," but rather ought to be considered in the light of economic realities and constraints under which farmers must work.
3. The adoption or non-adoption of certain recommended farm practices by commercial farm operators is not primarily a function of managerial competence, but a function of the size and certainty of marginal returns which might accrue.
4. The nature of economic incentives in farming must be considered the most critical factor in explaining present performance variations and future patterns of development.

8.6 The Nature of Economic Incentives in Farming

Under point No. 4 above, it is suggested that the nature of economic incentives in farming is a key factor in explaining performance variations. It is also argued that this factor will explain the persistence of chronically inefficient and of low-income operations. These hypotheses will be briefly examined in the light of data obtained for this study.

Three sources of economic rewards and incentives may be identified. These are:

1. Profits from the sale of agricultural products

2. Savings which accrue as a result of farm perquisites

3. Increases in net worth as a result of an appreciation in land values over and above the annual rate of inflation and capital cost.

All three sources of incentives are relevant to farmers. However, considerable evidence was obtained which would suggest the existence of a distinct difference between the serious commercial farmer and the low-income farmer in the manner in which these incentives are valued.

The full-time farmer who obtains a fair margin on his investment in land, labour, and capital will inevitably base his decisions upon his expectations of income derived from the sale of his products. If he is firmly committed to farming, farm perquisites at best are fringe benefits in the form of somewhat lower expenditures for food and housing and in the form of the non-material amenities of country living. Increases in net worth attributable to an appreciation in land values are of relevance only in as much as they constitute the equivalent of a retirement savings fund.

Thus it is argued that profits from the sale of agricultural products are the major source of economic incentive to the commercial full-time farmer. Farm profits and returns per unit of investment, however, vary considerably depending upon enterprise type, production-cost variations as a result of differences in location, and farm-to-farm variations in input mix. The last of these factors is of particular significance.

Net incomes⁶ for farms included in the sample range from a low of \$476 per year to a high of \$7,700. Only three farmers had net incomes below \$1,000 in 1967. However, if returns to family labour⁷ are calculated, 19 farms, or 44%, have annual returns below \$1,000. In fact, 13 of these 19 farms have negative returns to family labour. As one might expect, all of these 19 farms also have negative production function residuals. It goes without saying that farmers are aware of their low incomes, and that in many cases farm improvement and expansion programmes are undertaken to increase output and farm income. It is this process of farm adjustment which is at the very root of inefficiencies.

A total of 24 farmers in the sample, or roughly 56%, have indicated that they are presently undertaking farm improvements of various kind in order to increase the efficiency of their operations and their total income. Since these programs generally involve considerable sums of capital, they are undertaken very gradually and may extend over a lengthy time period. Thus a dairy farmer may consider the expansion of his dairy herd and the construction of a new silo. Assuming he invests \$6,000 in a new silo, it is clear that maximum returns on this investment will not be achieved without complementary investment in additional factors such as livestock, machinery and equipment, labour inputs etc. In other words, the operation will be inefficient as long as the expansion process is under way, and until a production equilibrium is re-established. The time period over which such inefficiencies normally extend could

⁶ Gross Income less Total Operating Expenditures.

⁷ Annual Gross Income minus Annual Capital Cost and Cash Operating Expenditures.

be reduced considerably by making one large investment and by undertaking all changes within a single production year. The reasons why farmers generally are unwilling to assume the burden and financial risks that would be involved in such a crash program, should not be sought in some alleged conservatism, but again in the limited economic returns which additional effort and investment promises.

Nine farmers with positive residuals and positive returns to family labour stated that they are planning to maintain their present level of production. All of these operations appear very efficient, and annual net returns are in excess of \$5,000. These are the only farms in the sample which may be considered to have achieved satisfactory adjustment.

The remaining ten farms have negative production function residuals. In seven cases, returns to family labour also are negative; that is, annual gross income is less than the combined amount of cash operating expenses and capital cost when total farm capital is rated at 6% per annum.

It is this group of farms to which the argument applies that farm profits represent a minor incentive, and that they persist because of farm perquisites and in anticipation of gains as a result of an appreciation in land values.

Two farmers in this group are planning to retire, a factor which tends to explain the low level of performance in both cases. The remaining eight farmers, however, despite very low net returns, stated that they are not planning any farm improvements or programmes to increase production or net income. In several cases, it was found that farm income is supplemented by seasonal off-farm employment, and five farmers in this group intimated that they hope to sell their property as soon as prices are right. Thus farm perquisites and local increases in land values appear to be the most cogent reasons for the persistence of these inefficient, low-income farms.

8.7 Summary and Conclusions

Research findings suggest that variations in biographical characteristics of farmers and differences in managerial competence are of only limited relevance in explaining farm-to-farm variations in economic performance.

It is suggested that the most critical factors are economic in nature. Differences in enterprise type, in location with respect to soil type, and differences in capital structure will have the inevitable effect of causing differences in cost-return ratios.

Very few farms have achieved satisfactory adjustment, while a very large number of operations appear to be inefficient as a result of protracted adjustment processes. Limited economic incentives in farm profits impair farmers' willingness to assume the financial risks which would hasten the transition.

Conclusions

It is estimated that 76% of the farms examined are economically viable or potentially viable operations. Thus out of a population of 146 farms from which the original sample was drawn, 76%, or 110 farms, would fall into this category. The total number of census farms in the township in 1966 was 250; 110 of these farms, or 44%, may be considered commercial operations.

There is considerable evidence that farm adjustments are taking place within this active segment of the entire farm group. Primary trends would appear to be toward greater investment in buildings, livestock, machinery, and cash inputs, whereas very little evidence was found of farm expansion in terms of acreage of cropland. It is suggested that more farmers would expand their crop acreages if land prices were in keeping with the expected returns. Measures to halt or to reduce artificial increases in land values are essential if satisfactory farm adjustment is to be achieved, and if the continuation of commercial farming is to be assured in the area. This statement is based upon the following arguments:

1. Current modes of investment by farmers are very expensive sources of additional income. Since land prices are exorbitant, farmers who wish to stay in business must invest in improvements rather than in additional land.
2. Continued increases in land prices will raise the capital costs of farm operations to the point where farmers will be induced to sell their property and to seek more profitable avenues of investment.

There is no evidence which would support the assertion that the family farm will soon be a thing of the past, and that vertical integration and large company farms are the panacea to the farm problem. One may rest assured that corporate interests will not invest in enterprises which the individual investor finds unprofitable. Scale is only one aspect of the farm problem.

Not all farmers have become captives of the idea that life in the city is better. The man who decides to stay on the farm despite alternative employment opportunities, is found to be a very competent farmer and businessman. If he is not, his chances to remain as a full-time farmer and to achieve a level of living comparable to that of the average wage earner in the city, are very small indeed.

The statement that young people are no longer interested in farming is only a half truth. Some very capable and well-educated young people are planning to farm. The profitability of farming will determine trends in the future.

Future agricultural developments in the Niagara Economic Region will depend to a very large extent on the price farmers will have to pay to effect farm adjustments and to obtain higher incomes.

Regional land use planning will have much to offer in this respect.

CHAPTER IX

LAND USE IN THE RURAL-URBAN FRINGE

The problem of urban expansion into areas adjacent to modern cities has been often and extensively documented. Many writers have described the extent of such non-farm development but few have analysed the factors causing it. For the most part, non-farm development outside cities is of a residential nature appearing in the form of single family dwellings along existing roads and highways. This outward migration to rural areas is quite evident throughout the Niagara Peninsula. Areas close to urban centres, particularly in the fruit-growing area below the escarpment, are characterized by extensive non-farm development.

In order to determine the reasons for this out-migration and its patterns, an economic approach was used in which land use in the rural-urban fringe was related to the price of land and the cost of commuting.

The large price differential between lots in the city and in rural areas results in some residential land buyers choosing a rural location in order to achieve the apparent savings. These savings are called apparent because by moving away from place of employment, the cost of commuting is increased proportionally. As the cost of commuting increases linearly with distance, the amount actually saved as a result of lower land costs becomes less. At some point beyond the urban area, the increased costs will equal the savings. Assuming rational economic behaviour on the part of residential land-buyers, this point should be the limit of residential development beyond the city. Concurrently, farmers living outside of the city see opportunities of increasing their income by working in the urban area. Under these circumstances, many farmers may normally be expected to seek off-farm employment.

Thus the area around the city will have its land use affected in two ways. Some land will be demanded by residential land buyers and its use will be converted directly from agricultural to residential uses. Other lands used by farmers who assume employment in the city will be used for agriculture only on a part-time basis. Beyond the zone influenced by the city, full-time agricultural pursuits should account for the major proportion of land used.

The economic model developed on the basis of the foregoing was employed to predict the pattern of non-farm development around Hamilton. The actual pattern of land use was determined by analysis of a twenty per cent areal sample in the Hamilton region. A stratified, systematic, unaligned, point sampling technique was used to choose a total of ninety-four sample concession blocks. Fig. 20 shows the location of these blocks. In each concession block, data were collected from 1967 assessment records to determine land use and type of tenure for all parcels of land.

Six land use categories were determined as outlined below.

1. Land used by full-time farmers and owned by farmers
2. Land used by farmers and owned by non-farmers

3. Residential
4. Vacant or Idle land
5. Commercial or Industrial land
6. Land used and owned by part-time farmers.

In order to calculate the theoretical limit of residential development, the following operations were carried out.

The cost of commuting was calculated based on an eight cent per mile cost of maintaining an automobile. Fig. 21 shows the annual cost of commuting at various distances from the city on the basis of this cost. Fig. 22 shows in map form the cost as a function of the distance from the city of Hamilton.

Data were collected from local real estate offices in order to derive a curve of values for residential lots at varying distances from the city. Fig. 23 shows the distribution of lot values.

The total savings due to land price differences was calculated and an amortization formula was employed to determine the annual savings at various interest rates. The savings resulting from urban-rural tax differences was added to the above figure to calculate the total annual savings. Fig. 24 shows the total annual savings and the cost of commuting at various distances from the city.

Thus a zone of rational residence in the Hamilton area is determined. The limits of this zone for various interest rates are shown in Fig. 25. Within this zone, the cost of commuting is less than the annual savings resulting from lower land costs.

The actual pattern of land use zones around Hamilton was derived from an analysis of the assessment data with six categories of land use as outlined above. The proportion of total assessment in each category was related to distance from the city by means of linear regression analysis. In the case of lands used and owned by full-time farmers, residential lands, commercial or industrial lands, and vacant or idle lands, a high degree of correlation indicated that the relationship between the portion of assessment accounted for, and distance from the city, was linear in each case. The low correlation coefficient obtained in the case of farm-used, non-farm owned lands indicates the need for increased sampling to determine the true population characteristics for this particular land use. Fig. 26 indicates the distribution of this use with distance from the city.

Fig. 27 indicates the land use distance relationships determined by the analysis. According to this data, a series of land use zones was determined for the Hamilton area as shown on Fig. 28.

Residential assessment accounted for the highest proportion of total assessment close to the city and diminished outwards to zero at a distance of 28.6 miles. Full-time farming accounted for approximately 25 per cent of the total assessment at the edge of

the city and was over 80 per cent at the 28 mile point. Part-time farming reached a maximum of just over 10 per cent between 14 and 21 miles from the city. It virtually disappeared at a distance of 34 miles from the city. Commercial and industrial assessment accounts for approximately 10 per cent of the total at the city limits and decreases continuously from there to the 23 mile point. Vacant land accounts for only two per cent at the city and decreases to zero at 24 miles.

The predicted limit of residential development was approximately 20 miles whereas the actual development continues to 28 miles. Variation appears to be due to two basic factors. Some residents work in the local area and live close to their work. Other variation is explained by the fact that decisions are not made rationally. Residents beyond the zone of rational residence are willing to pay some extra price for the aesthetic and social benefits derived from rural residence.

A questionnaire survey of non-farm residents provided insight into the motivation for moving outside of the city. Very few of the residents consciously realized the economics of rural residence. Most worked in Hamilton but did not consider commuting cost before moving out of the city. Further, they had no accurate idea of the actual commuting cost. There appear to be two types of rural non-farm residents. One type has a rural or small town background and lives in the country because he does not like the city. The other type consists of residents who have moved outside of the city for economic reasons although they may neither realize nor admit to this.

It appears that land use in the rural-urban fringe does follow a rather specific pattern which seems to be determined by economic criteria. It is obvious that agriculture cannot compete with housing in an open market for land. A continuing price difference between urban and rural land will result in residential development up to and slightly beyond the point where the extra cost of commuting equals the savings accruing from land price differences.

LOCATION OF SAMPLE BLOCKS

Figure 20

0 5 10 15
Scale in Miles

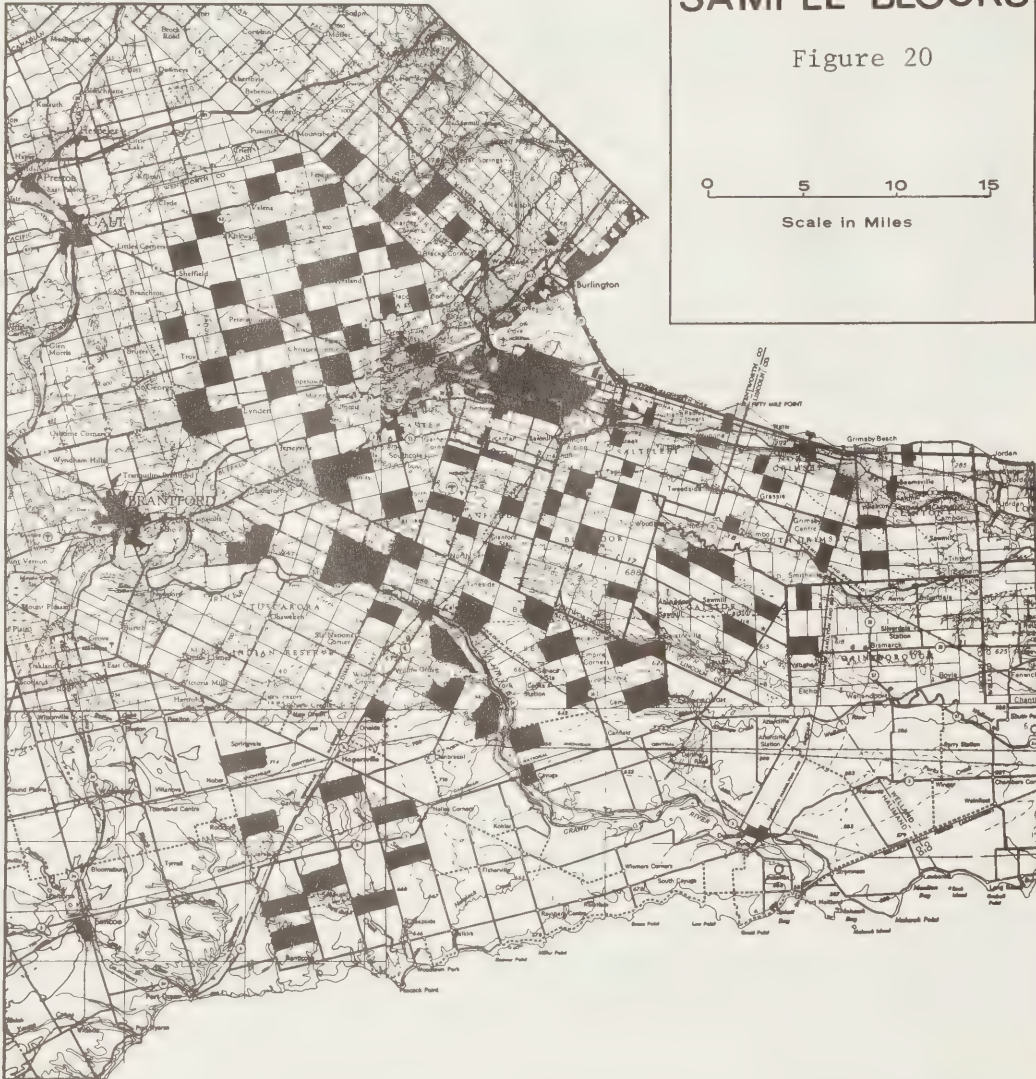
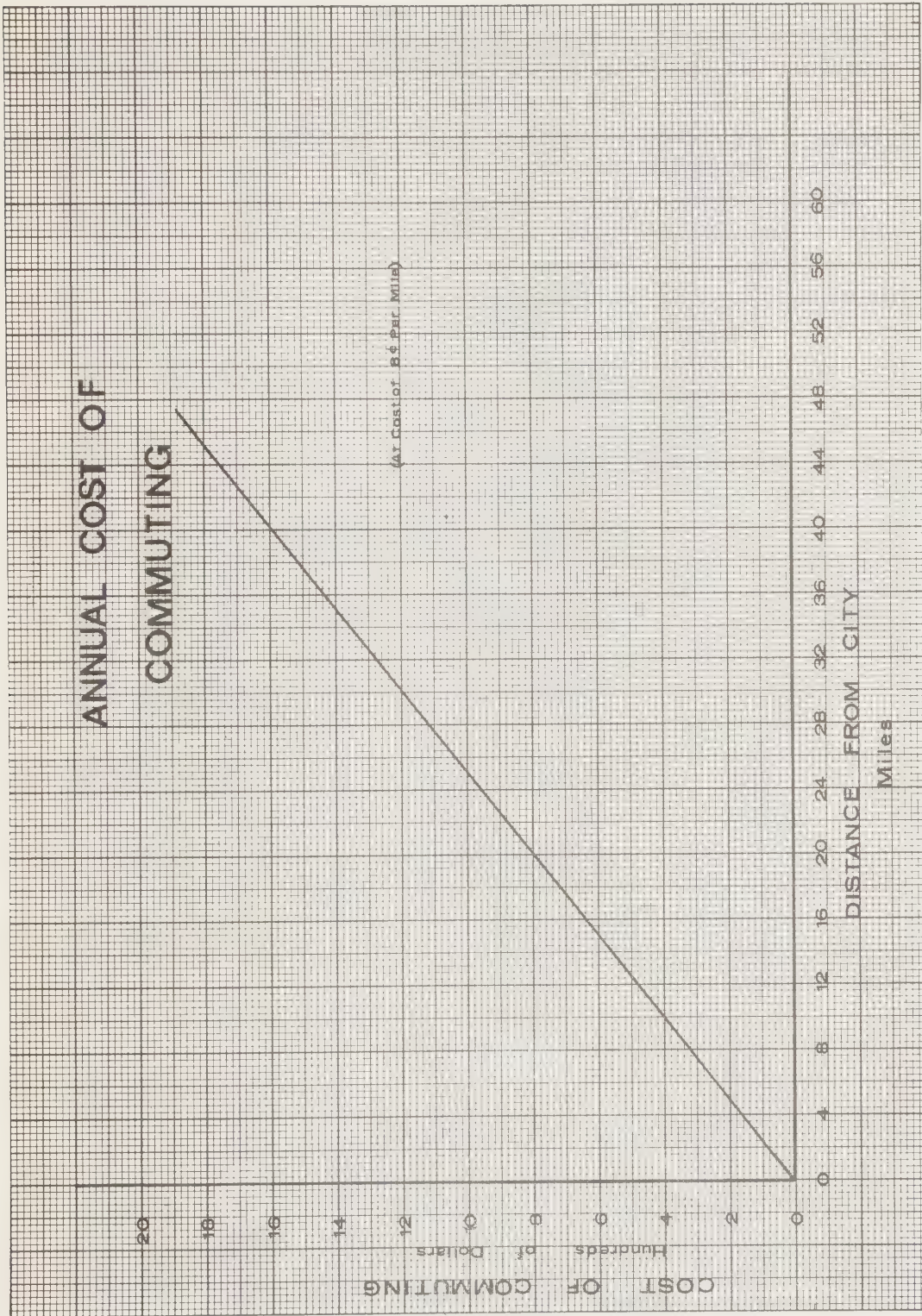


Figure 21



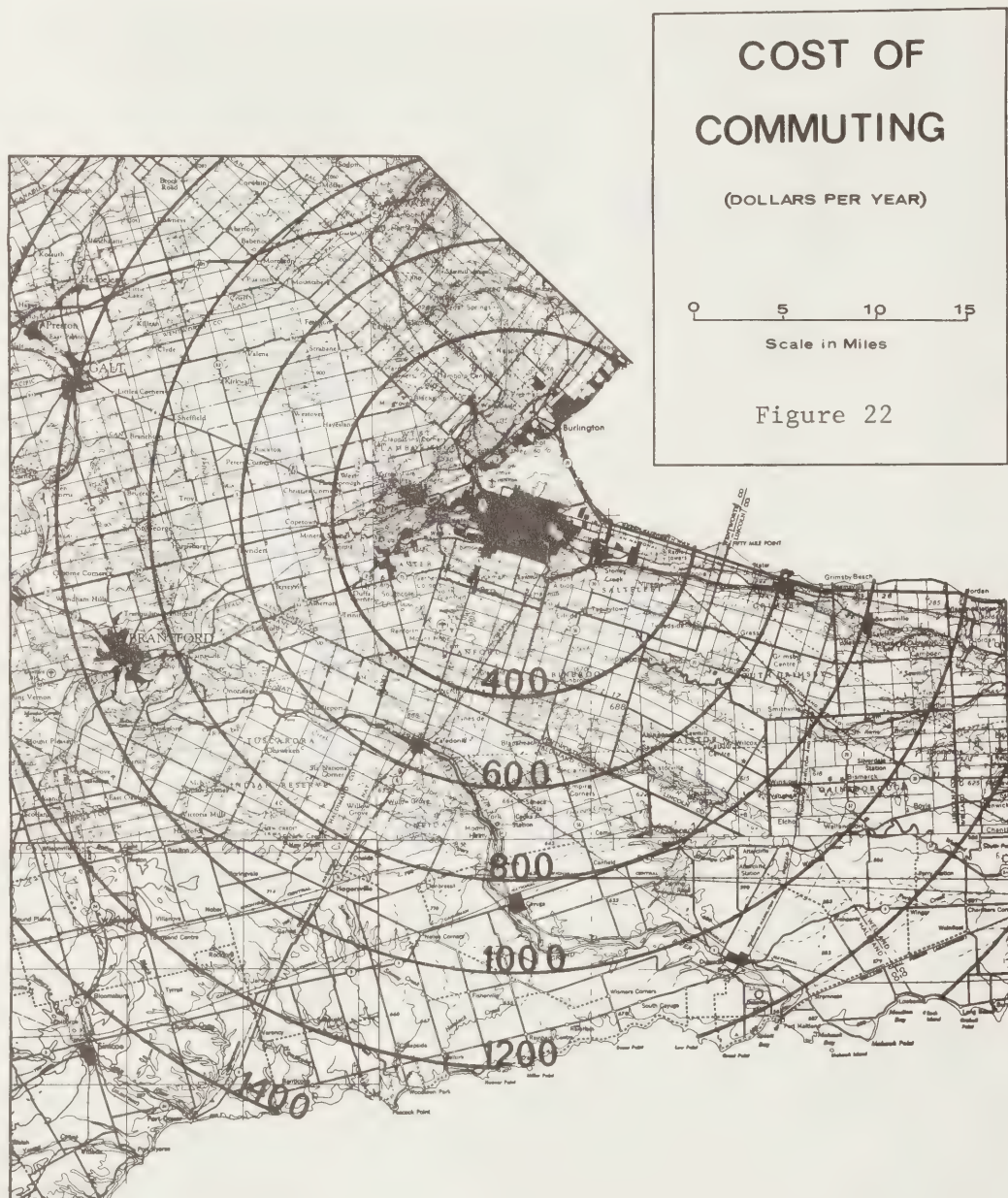


Figure 23

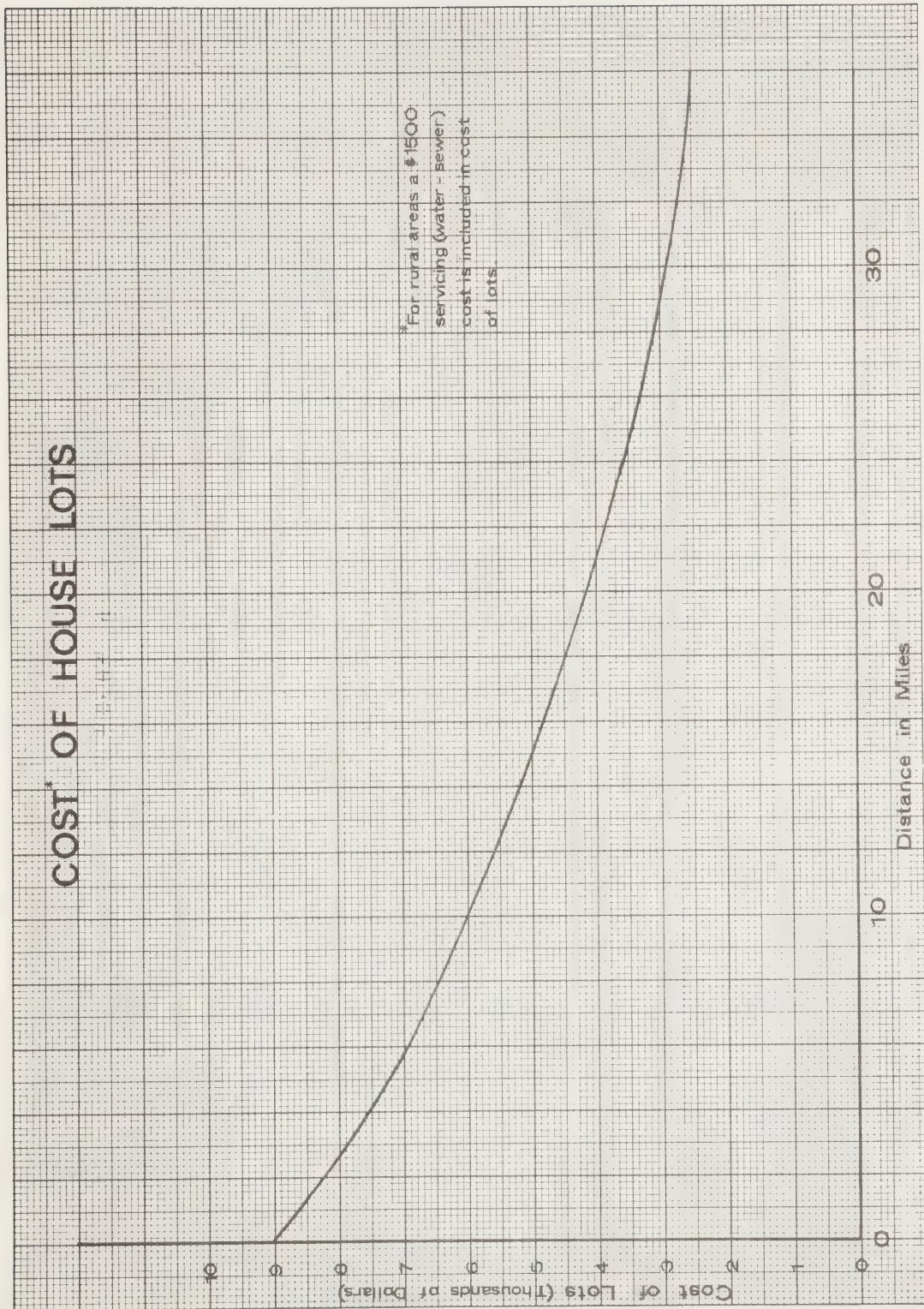
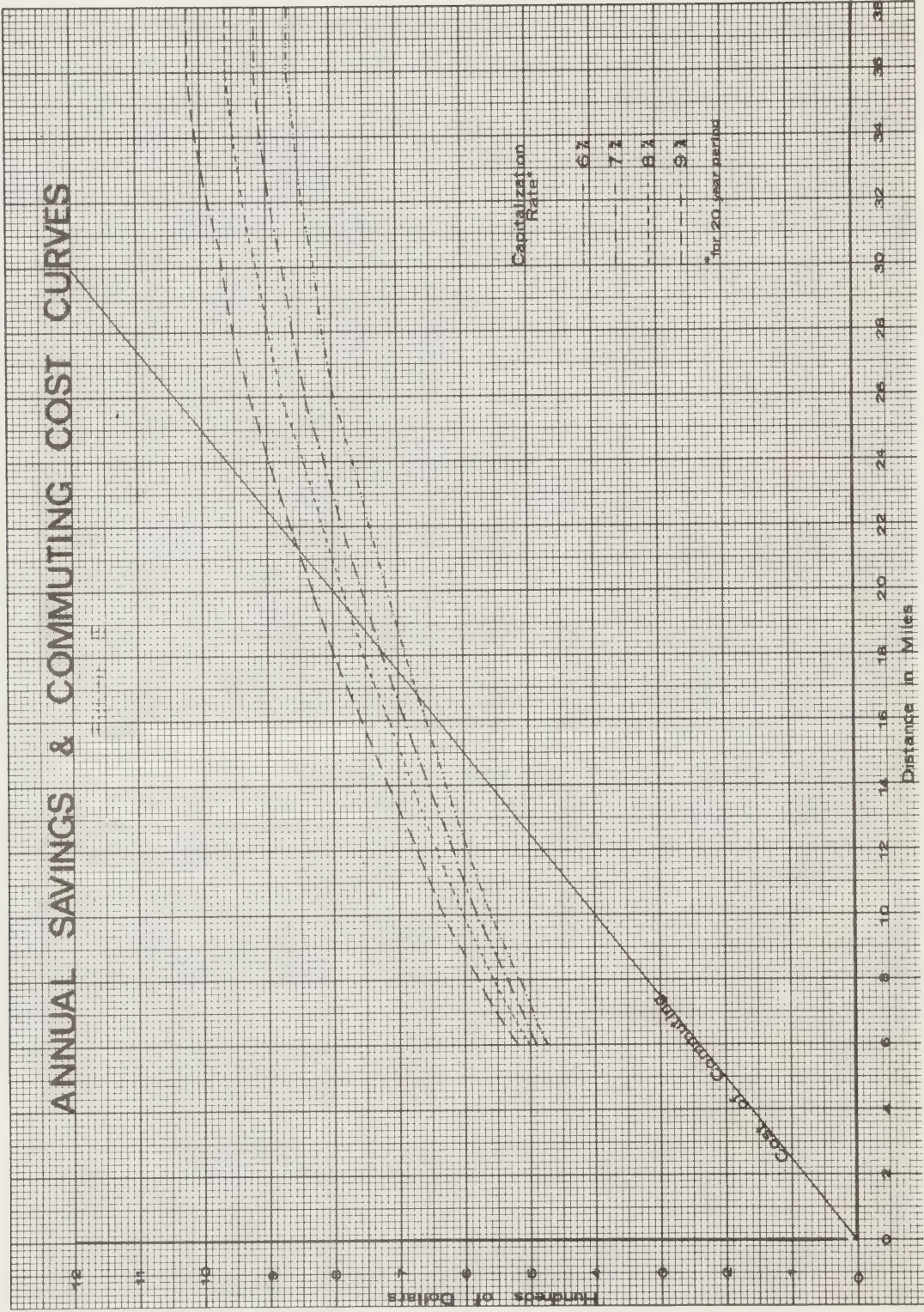


Figure 24



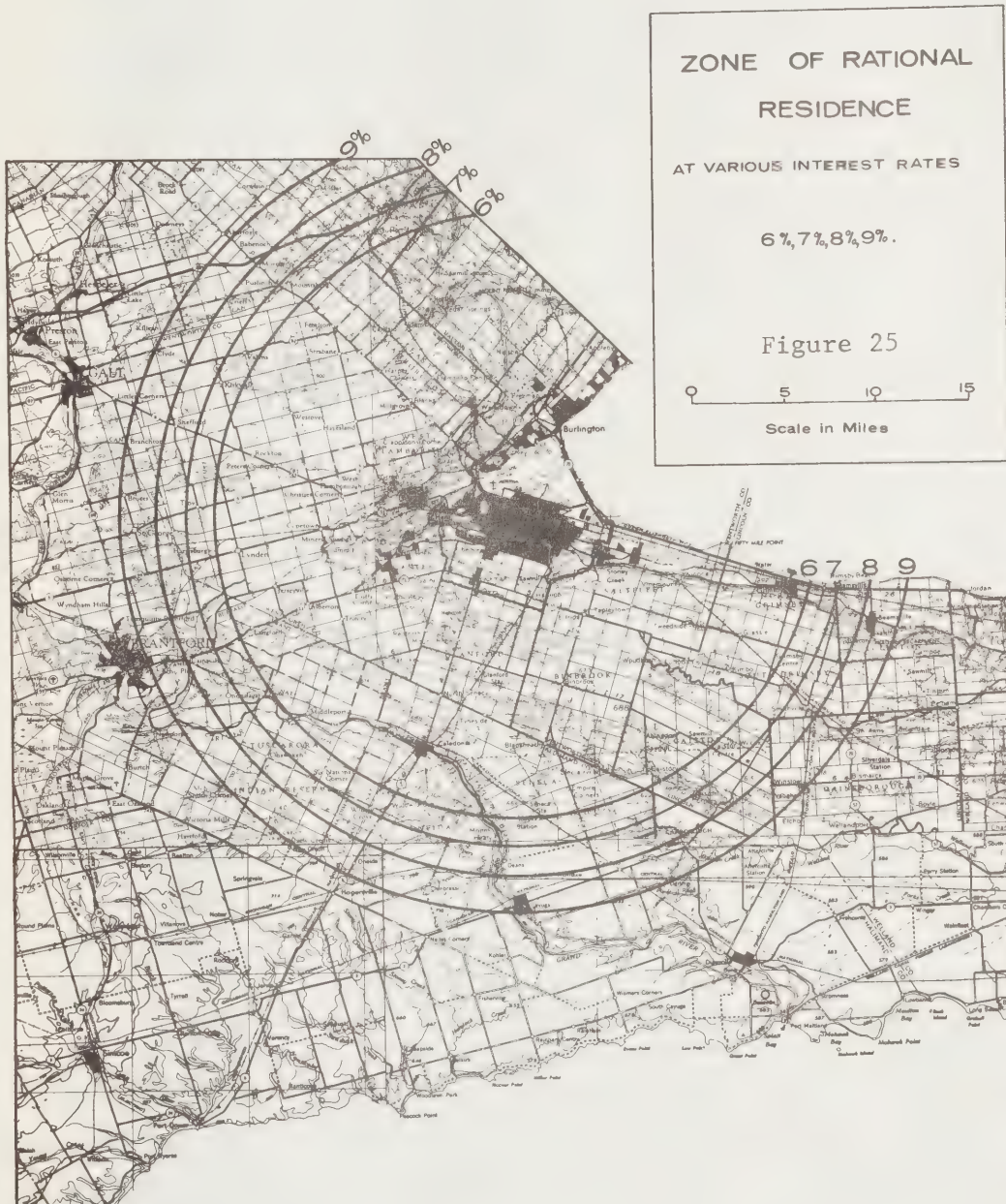


Figure 26

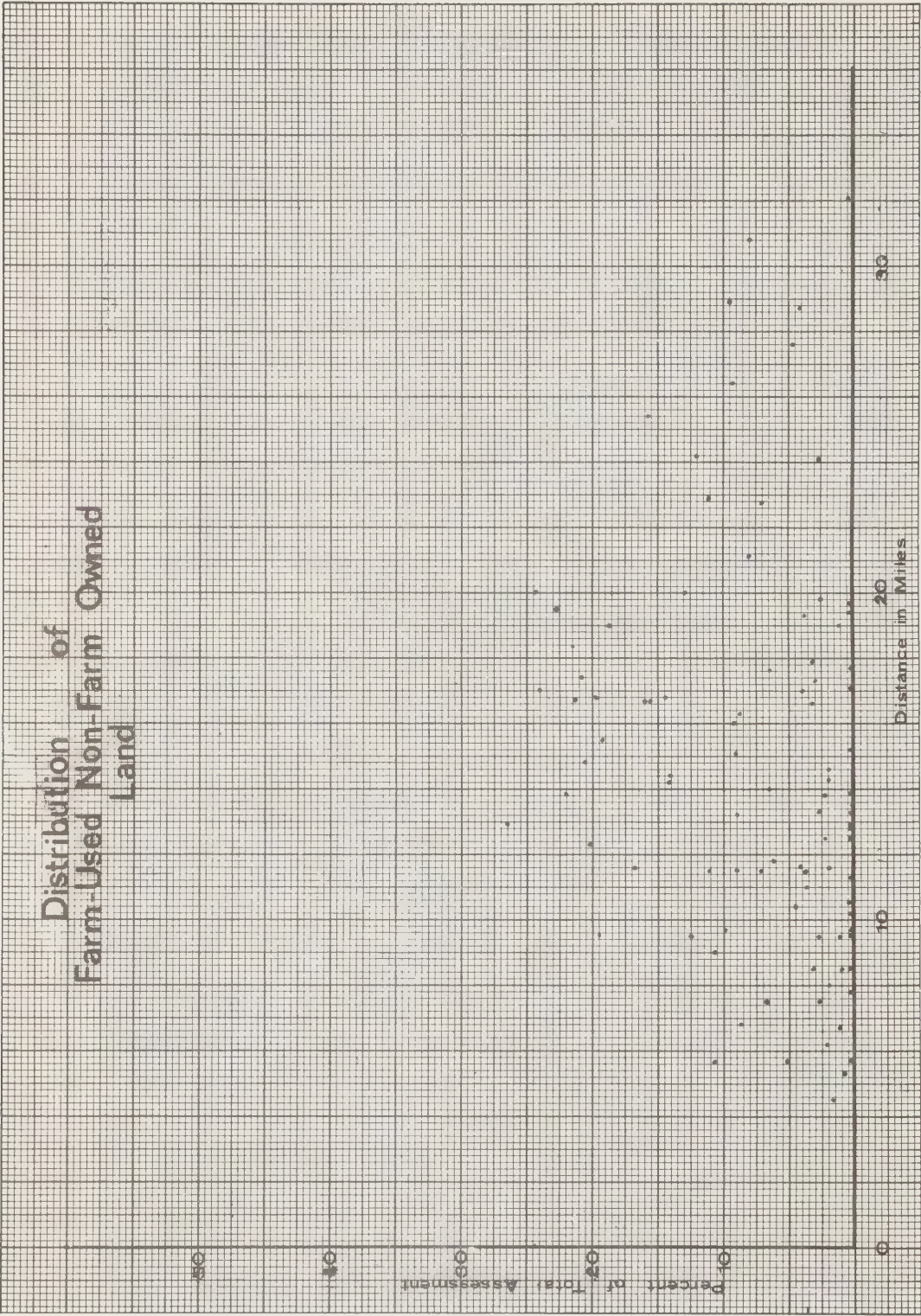


Figure 27

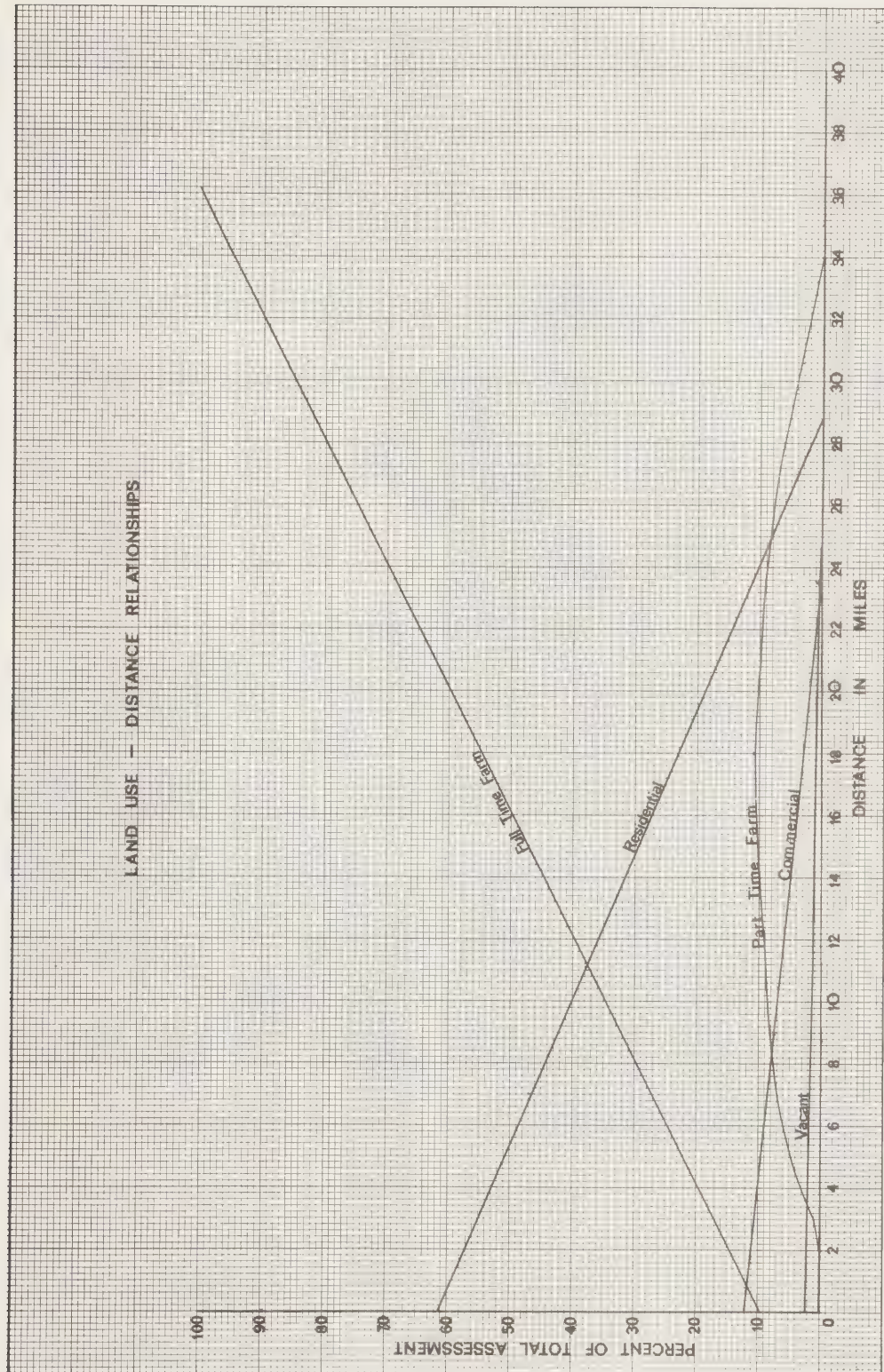
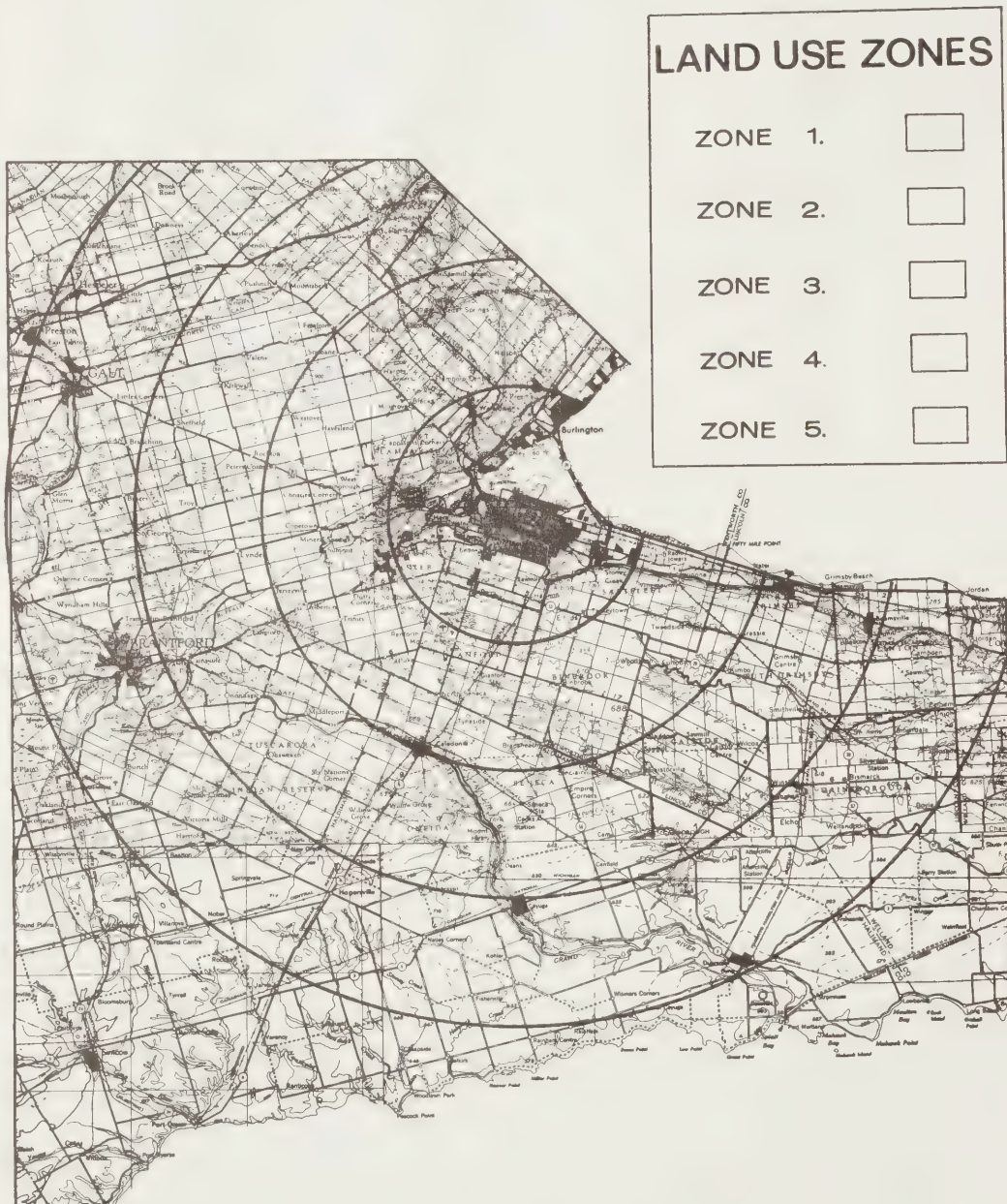


Figure 28



APPENDIX

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Non-Farm Questionnaire	105
Confidential Farm Survey Questionnaire – Seneca Township	107

**VARIABLE CODE AND DEFINITION
TWENTY-SIX VARIABLES**

V 1	SAMPLE BLOCK NUMBER 1 TO 51
V 2	FARM NUMBER 1 TO 106
V 3	SOIL TYPE NUMBER TENDER FRUIT SOIL = 1 OTHER SOILS = 2
V 4	TOTAL ACRES
V 5	ACRES OWNED
V 6	ACRES RENTED
V 7	ACRES TENDER FRUIT
V 8	ACRES GRAPES
V 9	ACRES OTHER FRUIT
V 10	ACRES TOTAL FRUIT
V 11	ACRES OTHER USES
V 12	YEARS OF OCCUPANCY
V 13	ESTIMATED VALUE OF LAND (DOLLARS PER ACRE)
V 14	FULL TIME FARMER ORIGINALLY NOT APPLICABLE = 0 YES = 1 NO = 2
V 15	STATUS OF FARMER FULL TIME = 1 PART TIME = 2 FULL TIME OFF = 3
V 16	FARM GOAL CUT BACK PRODUCTION = 1 MAINTAIN PRODUCTION = 2 INCREASE PRODUCTION = 3
V 17	MARKETING OVER 60 PER CENT SOLD TO CANNERY = 1 OVER 60 PER CENT SOLD FRESH = 2 APPROXIM. HALF SOLD FRESH, HALF TO CANNERY = 3
V 18	TOTAL CAPITAL LAND
V 19	TOTAL FARM CAPITAL
V 20	TOTAL FARM EXPENDITURES
V 21	GROSS ANNUAL FARM INCOME
V 22	NET ANNUAL FARM INCOME
V 23,24	PROBLEMS OF FRUIT GROWERS V 23 = MOST PRESSING PROBLEM, V 24 = SECOND PROBLEM LABOUR = 1, PRODUCTION COSTS = 2 PRICE OF FRUIT = 3, OTHER PROBLEMS = 4
V 26	ATTITUDE RE. SAVING THE FRUITBELT DO NOT CARE = 1 YES, BUT NOT FEASIBLE = 2 YES, AT ALL COST = 3

DATA SOURCE MATRIX

V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26
Saltfleet																									
1	1	2	24	0	24	9	0	2	11	13	18	6000	0	1	1	2	144000	155000	12000	18000	6000	1	4	0	2
1	2	2	20	20	0	5	0	0	5	15	30	6500	0	1	1	2	130000	158000	11000	8000	3000	1	2	0	2
2	3	2	48	41	7	2	20	20	44	4	80	5000	0	1	1	1	205000	242000	16000	21000	5000	3	0	0	1
2	4	1	40	40	0	2	12	18	32	8	36	2000	0	1	1	1	80000	125000	14000	18000	4000	3	2	0	2
3	5	2	15	15	0	1	1	1	3	12	3	2000	2	3	1	2	30000	36000	780	2000	1220	4	2	0	2
4	6	1	36	36	0	6	20	2	28	8	30	5000	0	1	2	1	180000	196000	5500	8200	2700	4	3	0	3
4	7	1	33	33	0	8	20	4	32	1	28	3000	0	1	1	1	100000	120000	8000	13000	5000	3	2	0	1
5	8	1	18	18	0	1	7	6	14	4	41	5000	0	1	2	1	90000	98000	4000	9000	5000	3	4	2	2
North Grimsby																									
7	9	1	6	6	0	6	0	0	6	0	10	5000	2	3	1	2	30000	45000	3700	4000	300	3	1	0	1
8	10	2	40	40	0	1	14	6	21	19	28	2000	1	3	3	1	80000	96000	6850	9750	2900	1	3	0	3
8	11	2	21	21	0	2	9	10	19	2	7	3000	1	3	2	1	63000	73000	2370	4500	2130	4	1	0	3
8	12	2	21	21	0	0	12	5	17	4	2	2000	1	3	2	3	35000	40000	1840	3000	1160	3	4	0	2
9	13	2	50	50	0	1	17	17	34	16	35	8000	0	1	2	1	40000	80000	14000	20000	6000	1	0	0	3
9	14	2	35	35	0	3	17	13	33	2	62	2200	0	1	2	1	70000	120000	9000	25000	16000	4	0	0	3
10	15	1	50	50	0	20	5	9	34	16	36	4000	0	1	2	1	200000	230000	18000	24000	6000	1	0	0	3
10	16	1	15	15	0	7	0	1	8	7	13	6000	1	3	1	2	90000	103000	3500	4000	500	3	2	0	2
12	17	2	42	42	0	0	23	4	27	15	3	500	2	2	2	1	21000	27000	4100	3700	400	2	0	0	1
12	18	2	25	25	0	0	15	5	20	5	24	1500	1	3	2	1	37000	47000	3600	4500	900	3	4	0	2
Clinton																									
13	19	2	17	17	0	4	12	3	17	0	3	900	0	1	2	2	16300	27000	8000	11500	3500	2	4	0	3
15	20	1	2	2	0	0	0	0	0	2	14	3000	0	1	2	0	60000	40000	37000	50000	13000	0	0	0	1
15	21	1	29	12	17	9	10	3	23	6	38	2500	0	1	2	3	30000	45000	12000	17000	5000	2	0	0	1
15	22	1	86	86	0	56	0	19	75	11	16	2000	0	1	2	2	172000	212000	38000	57300	19300	3	0	0	1
15	23	1	25	25	0	15	5	2	22	3	21	5000	0	1	1	3	125000	151000	11000	18000	7000	3	0	0	3
15	24	1	3	3	0	1	0	1	2	1	57	3000	0	1	1	2	90000	17000	1800	2300	500	3	0	0	3
16	25	2	96	96	0	0	0	0	0	96	12	900	0	1	2	0	86000	114000	12000	17500	5500	0	0	0	2
17	26	2	198	198	0	1	15	4	19	179	15	400	1	3	3	0	80000	110000	14500	18000	3500	2	0	0	3
18	27	2	40	40	0	4	16	3	23	17	12	2500	0	1	2	1	100000	115000	6000	9500	3500	2	3	0	2
18	28	2	44	44	0	4	12	4	18	26	46	1750	0	1	2	1	77000	107000	18000	26600	8600	3	4	0	2
18	29	2	105	105	0	0	90	0	90	15	26	2700	0	1	2	3	286000	330000	20000	35000	15000	4	0	0	3
18	30	2	32	32	0	1	8	12	21	11	27	3000	0	1	1	1	96000	112000	7000	9000	2000	2	0	0	1
19	31	2	6	6	0	0	4	0	4	2	22	1000	2	3	2	2	6000	16000	600	1000	400	2	0	0	2
20	32	1	40	40	0	20	0	12	32	8	27	1500	0	1	2	1	60000	90000	15000	20000	5000	4	3	0	3
20	33	1	2	2	0	2	0	0	2	0	2	1500	2	3	2	2	3000	500	500	1100	600	3	0	0	2
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DATA SOURCE MATRIX (continued)

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26
Louth	21	35	1	7	7	0	3	0	2	5	2	60	3000	0	1	2	1	21000	80000	1100	5000	3900	4	3	0	3
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	21	41	1	23	23	0	0	13	0	13	10	16	2000	2	3	3	2	46000	77000	2300	3000	700	4	3	0	2
	21	42	1	7	7	0	6	0	1	7	0	11	5000	0	1	2	2	35000	41000	2430	5500	3070	3	0	0	2
	21	43	1	5	5	0	0	0	0	0	5	5	8000	0	1	3	2	40000	44000	4000	12000	8000	0	0	0	3
	21	44	1	3	3	0	0	0	2	2	1	8	6000	1	3	2	2	18000	22000	1200	800	400	4	0	0	3
	22	45	2	55	55	0	0	40	0	40	15	18	1500	0	1	2	1	82500	112000	6000	15000	9000	1	2	0	3
	23	46	1	28	28	0	20	0	8	28	0	32	3000	0	1	2	1	84000	119000	20000	26000	6000	1	4	0	2
	23	47	1	35	35	0	24	0	6	30	5	22	2500	0	1	2	2	77500	110500	13000	22000	9000	1	2	0	3
	23	48	1	30	30	0	0	0	25	25	5	49	2500	0	1	3	1	75000	89000	7400	12200	4800	1	2	0	2
	23	49	1	15	10	5	10	2	3	15	0	47	2500	0	1	2	1	25000	48000	5300	11000	5700	4	0	0	2
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	25	51	1	32	32	0	16	0	8	24	8	37	2000	0	1	2	1	64000	81000	6000	10000	4000	3	0	0	2
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	25	53	1	26	26	0	16	0	10	26	0	22	2500	0	1	2	1	60500	88000	8500	19000	10500	1	2	0	2
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	27	55	2	90	90	0	0	40	0	40	50	35	1500	0	1	3	1	135000	170000	6000	15000	9000	2	4	0	3
	28	56	1	4	4	0	1	0	0	1	3	6	2000	2	3	2	2	8000	16000	1500	4800	3300	4	0	0	2
	28	57	1	49	49	0	17	8	14	39	10	4	3000	0	1	3	3	147000	185000	21500	30000	8500	1	3	0	3
	29	58	1	10	10	0	3	0	7	10	0	7	2500	0	1	2	1	25000	36000	2500	5000	2500	1	0	0	2
	29	59	1	18	18	0	16	0	2	18	0	3	4000	0	1	2	2	72000	88000	12000	17000	5000	4	0	0	1
	29	60	1	22	22	0	14	6	0	20	2	38	2500	0	1	1	2	55000	85000	13500	18000	4500	4	0	0	2
	29	61	1	27	15	12	0	0	0	0	27	1	2500	0	1	3	2	37500	77500	67000	100000	33000	3	0	0	3
Peilham	35	62	1	12	12	0	2	0	2	4	8	47	2000	0	1	2	1	24000	30600	3000	4800	1800	0	0	0	2
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	35	66	1	15	15	0	6	0	5	11	4	22	2000	0	1	2	1	30000	41500	2200	4300	2100	4	0	0	3
	36	67	1	10	10	0	2	0	3	5	5	12	2000	1	3	2	1	20000	30000	2000	4500	2500	4	0	0	0
	36	68	1	6	6	0	1	0	2	3	3	9	2500	1	3	2	3	15000	28500	700	2000	1300	4	0	0	3
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	38	70	1	92	92	0	0	0	2	2	90	36	2000	2	3	2	2	184000	192000	900	3500	2600	3	0	0	2
	39	71	2	98	98	0	0	15	0	15	83	1	3500	0	1	2	1	35000	65000	2500	5500	3000	2	3	0	2

DATA SOURCE MATRIX (continued)

V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26
41	72	2	50	50	0	0	46	0	46	4	19	2000	1	3	2	1	100000	123000	10000	15100	5100	3	0	0	1
42	73	2	25	25	0	0	5	0	5	20	19	2000	2	3	3	1	50000	67000	800	2200	1400	1	0	0	3
42	74	2	50	50	0	0	43	0	43	7	4	2000	2	3	2	1	100000	120000	1000	3500	2500	4	0	0	2
44	75	2	10	10	0	3	0	2	5	5	8	1800	2	3	2	3	18000	31000	400	500	100	4	0	0	2
44	76	2	23	23	0	7	5	5	17	6	25	2000	1	3	3	1	46000	59000	4100	5700	1600	3	2	0	1
44	77	2	62	62	0	3	27	10	40	22	16	1100	0	1	2	1	68200	103200	4700	1700	12300	4	0	0	3
44	78	2	15	15	0	3	0	2	5	10	8	2500	2	3	2	3	37250	44000	780	2100	1220	4	2	0	1
45	79	1	7	7	0	3	0	3	5	2	42	3000	0	1	2	2	21000	15000	750	2400	1650	2	0	0	1
45	80	1	7	7	0	2	0	3	5	2	1	2500	1	3	2	1	17500	26000	800	1700	900	0	0	0	1
45	81	1	10	0	10	5	0	4	9	1	3	2000	0	1	2	1	20000	30000	1800	2600	1800	0	0	0	1
45	82	1	10	10	0	7	0	1	8	1	14	3000	2	3	2	1	30000	42500	3000	4000	1000	3	0	0	2
45	83	1	10	10	0	4	0	2	6	4	2	4000	1	3	2	2	40000	52000	2500	3000	500	2	4	0	1
45	84	1	3	3	0	1	0	0	1	2	15	3000	0	1	2	2	9000	14000	800	2200	1400	0	0	0	0
45	85	1	10	10	0	7	0	3	10	0	36	2000	2	3	1	1	20000	42000	3200	4000	800	3	0	0	2
45	86	1	5	5	0	3	0	2	5	0	33	2400	1	3	2	2	12000	25000	1300	2000	700	3	2	0	0
45	87	1	9	9	0	7	0	2	9	0	2	4000	1	3	2	2	36000	60000	1600	7000	5400	2	0	0	1
46	88	2	70	70	0	21	20	8	49	21	30	1500	0	1	2	1	95000	125000	11000	18000	7000	4	0	0	2
46	89	2	20	20	0	2	18	0	20	0	17	2000	2	3	2	1	40000	90000	3100	16500	13400	3	0	0	2
46	90	2	10	10	0	2	6	2	10	0	1	2000	0	1	2	3	20000	30000	900	1500	600	3	4	0	0
48	91	1	8	8	0	1	0	2	3	4	30	1500	0	1	1	2	12000	21000	1200	1500	300	3	1	0	2
48	92	1	7	7	0	2	2	1	5	2	14	2000	2	3	1	1	14000	21000	1500	2200	700	4	0	0	3
48	93	2	9	9	0	3	1	3	7	2	10	2000	2	2	2	2	18000	26000	3600	4500	900	2	3	0	1
48	94	2	42	42	0	16	10	11	37	5	26	2000	0	1	2	1	84000	104000	14000	21000	7000	3	1	0	3
49	95	1	35	35	0	3	4	3	10	25	27	1600	1	3	1	2	56000	67000	4700	6200	1500	3	2	0	1
49	96	1	10	10	0	2	2	3	5	5	3	1400	2	3	3	2	14000	20600	3800	4000	200	3	2	0	1
49	97	1	10	10	0	3	6	1	10	0	7	1400	2	3	2	2	14000	22000	2000	2500	500	0	0	0	1
49	98	1	25	25	0	12	0	6	18	7	12	1000	0	1	2	1	25000	35000	8600	11300	2700	2	0	0	1
50	99	1	10	10	0	8	0	1	9	1	5	2000	2	3	2	1	20000	34000	700	1200	500	0	0	0	1
50	100	1	10	10	0	6	0	1	7	3	23	1800	2	3	2	1	18000	26000	3000	4600	1600	1	0	0	3
50	101	1	8	8	0	6	0	2	8	0	3	2000	2	3	2	1	16000	26000	3000	3700	700	4	0	0	3
50	102	1	10	10	0	2	0	1	3	7	21	1800	2	3	2	2	18000	27000	2600	4800	2200	1	0	0	3
50	103	1	4	0	4	0	0	0	0	4	3	2000	2	3	2	2	8000	14000	2500	3200	700	3	0	0	2
51	104	2	12	12	0	5	2	2	9	3	10	2000	2	3	2	2	24000	32000	4200	5000	800	2	1	0	1
51	105	2	14	14	0	7	0	3	10	4	21	2000	0	1	1	3	28000	42000	5000	8000	3000	4	0	0	1
51	106	2	70	70	0	31	15	9	55	15	17	2000	0	1	2	2	140000	185000	25000	32000	7000	2	4	0	3

Niagara

FARM QUESTIONNAIRE

Block No.	Township	Concession	Lot	Int. No.	Category	Code:				
Acreage	Owned		Rented		Rented Out		Owned Elsewhere			
Land Use (Acres)	Total Fruit	Peaches	Cherries		Apples	Pears	Plums	Apricots	Sm. Fruit	
			Sweet	Sour						
	Grapes	Vegetables	Nursery Prod.		Other Mixed Farm Prods.					
Land Value	When Bought		What Price		Est. Val / ac		Offers in last: 1 yr. 5 yr.		How much for?	
	Land Sales from Holding		Sold To			Offers By				
	Amount	Price								
Labour	Farm Full Time	Full Time Off	No. Months Off			What is Off-Farm job?				
	Where is Off-Farm Job	Full-Time Originally?			From City Originally?					
	Why do you farm part-time?									
	How far do you commute?				/ Month cost of commuting?					
	Size of Family.		Adults in House		Children	1 - 5	6 - 10	10 - 15	15 - 20	
	Does cost / availability of hired help affect farming operations?									
Marketing	Cannery Contract		Who do you sell to:		% of crop sold fresh?					
Future Plans	Cutback Maintain Expand		Increase Land		More Intensive Use.		Improve land.			
	Reduce Costs by Greater Capitalization				How?					
Capital	Equipment Replacement Costs:		Buildings		Trees		Total Cap'n Value			
Expenses	Labour	Taxes	Fertilizer		Chemicals		Others	Total Expenses		
	How does the additional Bookeeping associated with the C.P.P. affect you?									
Gross Income	Sale of Fruit		Sale of Vegetables		Nursery Prod.		Other			

FARM QUESTIONNAIRE *(continued)*

Opinions

What are the most pressing problems for you as a fruit farmer?

Some people have advocated preservation of the fruit belt. How do you feel about this?

What are your reasons for feeling this way?

(If in favour of Saving)

How can the fruit belt best be preserved?

Other Comments.

NON-FARM RESIDENTS

block	twp.	conc.	lot	int.	cat.	code	date
Property	Property Size		Owned		Rented		Time purchased
	Price Time of Purchase		Estimated present Value		Property Taxes (Annual)		
	Land	Land & Bldgs.	Land	Land & Bldgs.			
	First Occupant?		(if yes) Previous Use of this Land?				
	Previous Residence?				Other Property Owned?		
Family	School, Pre-School Children				Tot. Occupants		Age, Head of Household
	Place of Employment (husb.)				Occupation		
	Place of Employment (wife)				Occupation		
Services	What Services are available?						
	Sewers	Water	Loc. Schools	Garbage Col.	Paved Roads	Other	
	What Services do you expect in the future?						
	Sewers	Water	Loc. Schools	Garbage Col.	Paved Roads	Other	
Commutg.	Number of Vehicles			Average Commuting Cost per week			
	No. of trips p/w to nearest urban center					Which Center?	
	Where is most shopping done?			Approxim. distance from Residence?			
	Did you consider commuting costs at time property was purchased?						
Opinions	Why did you choose to live here?						
	Would you have moved out here if land values nearer to the city or within city limits were the same as here?						
	(If respondent says that it costs less to live in the country, ask:) In what ways do you feel you are saving by living in the country?						
	Are you in favour or against subdivision of land in your area?						
	Some people have advocated preservation of the fruitbelt. How do you feel about this issue?						

FARM SURVEY QUESTIONNAIRE

1. Aerial Photo (boundary, land use, soil type, etc.)

	1967	1957
Total acreage owned	_____	_____
Cropland and rotation pasture	_____	_____
Permanent pasture	_____	_____
Woodland	_____	_____
Did you rent any land in 1967	_____	
Cropland and rotation pasture	_____	
Permanent pasture	_____	
Other land	_____	

2. Do you feel your present acreage of cropland and pasture is adequate?
3. (If inadequate) What would you say are the main reasons that prevent you from expanding your acreage by renting or buying additional land?
4. Roughly how much would you have to pay per acre of cropland in this area?
- a. if buying _____ b. if renting _____
5. What distance from your farm would you be willing to travel?
- a. to buy land _____ b. to rent land _____
6. Now, here is a system for classifying land on the basis of its usefulness for farming (read card and explain). Roughly what fraction of your land falls into each of these categories?
- Class I _____ Class II _____ Class III _____ Class IV _____
7. How much additional cropland would you require to have the kind of farm operation which you consider ideal?
8. What is the main soil type on your farm?
9. Have you ever had your soils tested?
10. Are your soils deficient in any way?

11. What have you done to correct these problems?

12. How do you decide what kinds of fertilizer to use for different crops and in what quantities?

13. What made you decide to farm?

Summary:

Operator

Wife

Born, raised on farm?

Where and when?

Occupation of father?

Size of home farm?

Type Enterprise?

Brothers, Sisters?

Inherited, bought?

Formal education?

Other training?

Non-Farm work history?

14. (If applicable) If you were asked to compare your father in terms of his ability as a farmer, with other farmers in the community in which you lived as a child, would you say he was like most other farmers in the community, or do you feel that he was *more* or *less* successful?

What are your reasons for feeling that way?

15. Do you remember off hand what grade he completed in school?

16. Speaking about school, how much education do you need to be a farmer today?
What do you think?

17. How many years of experience have you had operating your farm?

18. Well, with this kind of background, do you feel that there is a future in farming for young people today?

What are your reasons for feeling that way?

19.What do you personally like most about farm life?

20.What do you like least about it?

21.How does your wife feel about farm life?

22.Do you have any children? Could you please tell me their ages, and what each one is doing?

CH	M? F?	Age	M? S?	FE	OT	Where living				Occupation	Occupational Aspiration	
						H	O	F	T	C	Parent	Child
1												
2												
3												
4												
5												
6												
7												
8												

23.Are there any other people living with you which are members of the family? (How many?)

24. Do you or your wife belong to any farm or community organizations or to any other organized groups?

Membership? Attend Meetings? Committee Member? Office Holder?

Name of Organization		Husband				Wife			
		1	2	3	4	1	2	3	4
		M	A	C	O	M	A	C	O
A. RURAL	1.								
	2.								
	3.								
	4.								
	5.								
	6.								
B. RELIGIOUS and COMMUNITY	1.								
	2.								
	3.								
	4.								
	5.								
	6.								
C. OTHER	1.								
	2.								
	3.								
	4.								

25. What do you think about farmers' Unions?

What are your reasons for feeling that way?

26. Here are a few other things I wish to check off:

(✓ for yes, X for no)

Electricity? _____ House _____ Barn _____
 Water piped into the house? _____ Hot _____
 Central heating system? _____
 Year house was built? _____ No. of rooms? _____
 Television? _____ Radio? _____ Telephone? _____
 Freezer? _____ Family car? _____
 Year and Model of car? _____ Daily Newspaper? _____
 Weekly Newspaper? _____

27. Farm Journals

Regular Public. of Farm
Organizations

Magazines

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

28. Who is the Agricultural Representative for your area?

29. In the past year have you had any contact with his office either by writing _____ by telephone _____ or personally? _____

	Type and Number of Contacts		
	Writing	Telephone	Personal
O.A.C. or other Agric. Schools	_____	_____	_____
Ont. Dept. of Agric. excluding above	_____	_____	_____
Fed. Dept. of Agric. or V.L.A.	_____	_____	_____

30. Now, I wonder if you could please give me some information about your farm operation. I would like to know what livestock you have, what equipment you are using, approximately how much labour is required to operate your farm, what sort of operation and production costs you encounter, and some estimate of your gross income.

Livestock	How Many	Approximate Value Each
Dairy Cows (total)	_____	_____
Dairy Cows (milked)	_____	_____
Dairy/Beef Cows	_____	_____
Heifers	_____	_____
Steers	_____	_____
Calves	_____	_____
Hogs	_____	_____
Weanlings	_____	_____
Laying Hens	_____	_____
Broilers	_____	_____
Turkeys	_____	_____

Comments:

			Year built	Year bought	Price paid	Replacement value
31. Equipment	hp	Model				
Tractor			_____	_____	_____	_____
Tractor			_____	_____	_____	_____
Tractor			_____	_____	_____	_____
Combine (sp) (pt)			_____	_____	_____	_____
Swather (sp) (pt)			_____	_____	_____	_____
Forage Harvester & Wagon			_____	_____	_____	_____
Seed Drill			_____	_____	_____	_____
Dairy Equipment			_____	_____	_____	_____
Baler			_____	_____	_____	_____
			_____	_____	_____	_____
Sprayer			_____	_____	_____	_____
Cultivating Equipment			_____	_____	_____	_____
			_____	_____	_____	_____
			_____	_____	_____	_____
			_____	_____	_____	_____
			_____	_____	_____	_____

32. Speaking about farm machinery, did you hear about the recent government inquiry into the cost of farm machinery?

What do you think about it?

P.

33. Do you repair and overhaul your machinery yourself?

What time of the year is that usually done?

Do you have a machine shed or a workshop in which you can do this kind of work?

Do you have your own welding equipment?

Labour

34. Could you please give me as close an estimate as possible of the hours of work spent on your farm by yourself, and by people helping you?

Month	Operator			Wife									Hired Help		
	h/d	d/w	w/m	h/d	d/w	w/m	h/d	d/w	w/m	h/d	d/w	w/m	h/d	d/w	w/m
January															
February															
March															
April															
May															
June															
July															
August															
September															
October															
November															
December															

Off-Farm Employment

	Operator	Wife	Son
35. Place:	_____	_____	_____
Type of Work:	_____	_____	_____
No. of Months:	_____	_____	_____

Operating Expenses

36. Do you know what your total operating expenses for 1967 were? _____

1. Feed, Concentrates, Supplements _____
2. Farm Chemicals, e.g. weedkillers, seed treatment _____
3. Fertilizer _____
4. Veterinary Fees _____
5. Veterinary Medicine _____
6. Equipment Repair and Parts _____
7. Fuel Cost, i.e. Gas, Oil, Lubricants _____
8. Hydro and Telephone _____
9. Rental of Equipment _____
10. Wages of hired help _____
11. Wages to family members for farm help _____
12. Custom work done for you _____
13. Property Taxes _____
14. Rent for land _____
15. Payments on Machinery _____
16. Mortgage Payments on land and bldgs. _____
17. Total Interest paid on loans, mortgages _____
18. Capital Cost Allowance _____
19. _____
20. _____

37. Farm Products Sold, Price Range

	<u>Units Sold</u>	<u>Price/Unit</u>	<u>High</u>	<u>Low (1967)</u>
Fluid Milk	_____	_____	_____	_____
Cream	_____	_____	_____	_____
Eggs	_____	_____	_____	_____
Steers	_____	_____	_____	_____
Other Cattle	_____	_____	_____	_____
Calves	_____	_____	_____	_____
Hogs	_____	_____	_____	_____
Weanlings	_____	_____	_____	_____
Poultry	_____	_____	_____	_____
Grain	_____	_____	_____	_____
Hay	_____	_____	_____	_____

Did you have any income from Custom Work _____
 Rental of Equipment _____
 Rent for Land _____

What was your total farm income in 1967?

38. Would that be higher, lower or about the same as your income in each of the previous three years?

How do you account for that?

Here are a few questions about farm management and farm practices.

39. The operation and management of a farm obviously involves a great many decisions to be made, such as how much to plant of each crop, how much money to spend on fertilizer, what feed combinations to use for livestock and so on.

Now, could you tell me something about how you make these decisions, do you "figure things out" in your head or do you make paper calculations?

40. What factors do you consider when making an important production decision? For example, a farmer may wish to add a few animals to his dairy herd, but decides against it because it would take him too much additional time to look after a larger number of animals. In this case the amount of labour required was an important point in his decision.

What factors do you usually consider?

41. Do you have any important long-range goals, that is, plans for your farm which you may wish to put into effect in the next few years?

For what reasons do you plan these changes?

42. How far ahead can you usually plan?

43. How much cash do you think a farmer should have over and above his total expected yearly expenses to take care of unforeseeable circumstances?

44. Do you usually have hay left over i.e. more than you need in a normal year?

P.

45. Do you usually keep more grain in store than you actually need just in case you have a bad year?

46. Many farmers today make use of loans for farm improvements, to purchase new equipment, or to increase the size of their operation. How do you personally feel about the use of short or long term loans in connection with your farm business?

P.

47. Availability of credit?

48. Do you usually buy tested grain for seeding?

Reasons?

49. Do you usually plant treated seed?

50. Do you use atrazine, 2-4D or any other chemical to control weeds in your fields?

How do you control weeds?

51. Do you keep any written farm records?

What kind of information would you be able to obtain from your records?

- | | |
|------------------------------------|--------------------------------|
| A. itemized expenses | E. record of breeding dates |
| B. itemized receipts | F. rates of fertilizer applied |
| C. prices received or paid/unit | G. yield relationships |
| D. quantities of products produced | H. household expenditures |

other:

52. Who does the record keeping?

53. Do you think there will be any changes in federal or provincial government programs and policies for farmers in the next two years?

P.

54. I think there is general agreement among farmers that the biggest problem facing them today are spiraling costs of production without commensurate increases in returns. I wonder if you have any ideas on what might be done to correct this situation?

55. Do you think the price of (important output) _____ will increase, decrease, or remain the same in the next 12 months? _____. In general, for what reasons do you expect that the price you will receive will be . . .

56. What about the price you have to pay for fertilizer, do you expect it to increase, decrease, or remain the same?

In general, for what reasons do you expect that the price you will have to pay for fertilizer will be

57. From time to time there are new developments in agriculture, such as a new crop variety, better livestock, an agricultural chemical to spray weeds or to control insects, a new machine to save labour, or a new farming method such as zero grazing. Could you tell me please, if in the last two or three years you have begun using one or several improvements of this kind?

Which ones?

(Select one) Who was the first farmer in this area to use . . . ?

How did you *first* find out about it?

What was your main reason for changing to . . . ?

58. How do *you* generally find out about new developments in farming such as the ones I have mentioned?

59. Now, here is a list of different sources of information which a farmer may use at one time or another to make farm decisions.

Could you please tell me *how useful* these sources of information have been to *you* in the past, by placing a check mark in the appropriate box.

If there is any source of information which you have never used then just leave the box blank.

SOURCE OF INFORMATION	OF NO USE	OCCASION. USEFUL	FREQUENT USEFUL	ALWAYS USEFUL
1. PAST EXPERIENCE	_____	_____	_____	_____
2. EXPERIMENTATION ON YOUR OWN FARM	_____	_____	_____	_____
3. FARM RECORDS	_____	_____	_____	_____
4. OBSERVING OTHER FARMERS	_____	_____	_____	_____
5. FARM MAGAZINES	_____	_____	_____	_____
6. NEWSPAPER	_____	_____	_____	_____
7. RADIO	_____	_____	_____	_____
8. TELEVISION	_____	_____	_____	_____
9. FARM ORGANIZATIONS	_____	_____	_____	_____
10. ONTARIO COLLEGE OF AGRICULTURE	_____	_____	_____	_____
11. TALKING TO A SUCCESSFUL FARMER	_____	_____	_____	_____
12. GOVERNMENT PUBLICATIONS	_____	_____	_____	_____
13. NEIGHBORS	_____	_____	_____	_____
14. MACHINERY & SUPPLY DEALERS	_____	_____	_____	_____
15. AGRICULTURAL REPRESENTATIVE	_____	_____	_____	_____
16. FAIRS, FIELD DAYS OR DEMONSTRATIONS	_____	_____	_____	_____
17. BANKS FARM CREDIT CORP.	_____	_____	_____	_____
18. AUCTION SALES	_____	_____	_____	_____



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